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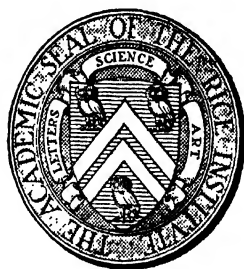
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THE RICE INSTITUTE PAMPHLET

VOLUME TWO



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Published by

THE RICE INSTITUTE

A university of liberal and technical learning
founded by William Marsh Rice in the City of
Houston, Texas, and dedicated by him to
the advancement of Letters, Science, and Art

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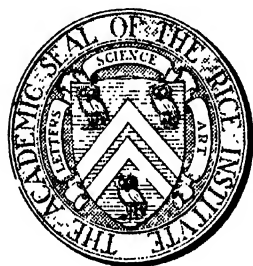
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THE STUDY OF POETRY¹

I

THE FUNCTION OF A UNIVERSITY

THE inauguration of a new institution of university rank is a fitting occasion for reviewing the field which such institutions exist in order to cover; for going back for a moment to first principles, and endeavouring to state, in the simplest terms, why such institutions exist, and what they may effect towards the moulding of a new generation, and the elevation of civic and national life. Different universities, according to the circumstances of their foundation and history, can shew different reasons for their existence and for being such as they are. But all of them, whatever the date of their origin, whatever the place of their settlement, have come into being in response to certain demands of the place and the time. All of them have been founded with a purpose single in its nature, though diverse in its manifestations. That purpose is to make stated and secured provision for the higher needs of a civilised community. The needs, like the pursuits, of a community are many. But its civilisation is one. It is the object of a university to gather up that civilisation, to analyse and study its separate elements in order to recombine them at a higher power, and thus to give conscious direction to the human mind in its knowledge of the past, its understanding of the present, and its power over the future. Its office is to store up, to sort out, and to impart knowledge; and by doing so it accumulates, organises,

¹ A discourse prepared for the inauguration of the Rice Institute, by Professor John William Mackail, formerly Professor of Poetry in Oxford University.

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and gives forth power. Knowledge is power, according to the old saying; it is latent or stored power. Conversely, power is knowledge transformed into energy; knowledge in action. Education, the process which goes on in a concentrated form and at high pressure in a university, is a mechanism by which the potential energy of the human mind is developed, disciplined, cleared for action. Knowledge is indeed an end in itself, and one which has a value that may properly be called inestimable, since it cannot be expressed in the terms of any other value. Riches, comfort, health, fame, influence, beneficence, are things of which knowledge pursued for its own sake and as an end in itself takes no heed. But while knowledge is or may be an end, education is only a means: a means to knowledge, for such as desire knowledge for its own sake; but for all who pass through it and undergo its influence, a means to the practice and conduct of life.

Hence in any community the idea of a university, the sort of education which a university will be planned and meant to give, will depend on the kind of life which that community desires, aspires towards, sets before itself as worth attaining. In the ancient world the earliest institutions to which the name can in any sense be applied were religious colleges—schools of the prophets, as they are called in the Old Testament, or training-colleges of the priests, as they existed and flourished in Babylonia or in Egypt. The knowledge and power after which they sought, which they accumulated, recorded, and transmitted, were the knowledge of and the power over supernatural forces. For these supernatural forces were then, according to the common belief, what governed the life of mankind and held it at their mercy; to understand them and their ways, and thus to gain the power of foreseeing their action, propitiating their favour, giving

this or that direction to their working, was no mere matter of abstract study or idle speculation: it was most severely and immediately practical; it lay at the root of individual and national prosperity. Without education in this all-important and all-embracing knowledge, industry and commerce, arts and manufactures, the conduct of war and peace, were blind and helpless: in a word, life was impossible.

Out of that world rose, after many ages, what we know as the classical civilisation. This was the work of Greece, carried on and consolidated by Rome. The universities of the Græco-Roman world belong to the same period which saw, for the first time, the rise of a trained governing class of organisers and administrators. Hence in these universities the subjects pre-eminently studied were those necessary for such a class: oratory, law, politics, and finance. At the same time the creation of a trained governing class set free those who did not belong to it, whether excluded by birth and fortune or holding aloof by choice from active pursuit of the duties attaching to the work of government. These, and especially the latter class, those who deliberately abstained from active public life, might now pursue knowledge for its own sake; and other universities arose which, in response to this new demand, devoted themselves to the sciences: on the one hand, to the pure or abstract sciences, those of the human mind, like grammar and logic and metaphysics, and those of the physical world, like botany or chemistry or astronomy; and, on the other hand, to the applied sciences, such as engineering or mechanics or medicine, or to those sciences which are also arts, like rhetoric or music.

When, in the Middle Ages, men began to gather together the wreckage of the ancient civilisation and to reorganise life on a fresh basis, their notion of a university was fun-

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damentally different. For the mediæval notion of the world was that it was something limited, precise, and ascertainable. It was something of which complete knowledge was possible; and to give this complete rounded knowledge was the function of education. The forms of life were prescribed by dogma; and the substance of life, on all its sides and in all its manifestations, was what could be comprehended in these forms. Just as theology was fixed and bounded by the authoritative doctrines of a universal or Catholic Church; just as political and social life was fixed and bounded by the equally authoritative constitutions of the universal Roman Empire, which held sway over men's minds long after it had itself ceased to exist except as a memory of the past or a dream of the future: in like manner and to a like degree were the form and the content of all knowledge determined and limited. Treatises were written *de omni scibili*, 'concerning everything which is capable of being known.' This was an ideal, in so far as few, if any, had the vigour of mind, the industry, acuteness, and patience, that were required for its attainment. But it was, given these qualities in the student, an attainable ideal. A university professed to offer, its students came prepared to receive, universal knowledge. The mediæval curriculum—the *trivium* and *quadrivium* of educational legislators—was the same everywhere; was one, complete, and unalterable. Study might be pursued further in certain branches of it than in others; but that was only in so far as the student failed to complete the full course which would leave nothing more to learn or to know. The *Summa Theologiæ*, the sum and substance, over all its range and into all its details, of divine knowledge, was actually put together and written down; the *Summa Scientiæ*, the sum and substance of secular knowledge, was the under side, as it were, of that other fabric, and could not extend beyond its limits.

That is to say, all learning, both liberal and technical, was the province of a university; the scope and limits of all learning were imposed from without by a dogmatic and omnipotent theology, and whatever knowledge lay beyond these limits was either proscribed as sinful, or its existence was denied.

Hence the human mind was not only bounded but crippled. Practice did not, indeed, follow theory to its rigid consequences. Schools of medicine, of civil law, even of natural science, grew up here and there, and flourished precariously under the jealous eyes of the Church. Art grew up of itself, without any systematic art-training. Architecture and engineering were in the hands of guilds, where knowledge was transmitted, in theory and practice, as a secret treasure from father to son or from master to apprentice. Painting and the sister arts wrought out a tradition of their own. Poetry insisted on making itself heard, but was discountenanced as heathen vanity or worse. The brilliant culture of Provence, which had gone out of Europe to the Arabs for a new and larger life, was crushed by armed force, and perished under the sword of the so-called Crusaders or in the fires of the Inquisition. Even at the end of the Middle Ages, and when the new world of the Renaissance was forming itself, Chaucer, the first of our own poets, ended by a formal and express disavowal of his own poetry, revoking and retracting it (all except legends of saints, and homilies, and books of morality and devotion) as vanity and sin. Physical science was equally suspect, and was subject, down to the time of Galileo and later, to equally jealous control and equally vindictive persecution.

This tyranny of theology lasted long enough to affect the modern universities likewise, down to a time which is within living memory. It was not broken either by the Reforma-

tion or by what is called the Revival of Learning. For the Reformation, as indeed its name implies if we consider its real meaning, only recast that tyranny in a new shape, 'reformed' it and imposed it afresh on the human mind; and the Revival of Learning was a partial, imperfect and agonising struggle to regain that freedom of the intelligence on which all freedom and all progress ultimately depend. The pre-Revolutionary foundations in the American Colonies, like Harvard (the mother and head of American universities) and Yale (created in the first year of that eighteenth century which was the liberating age of human thought), were theological colleges, restricted by the tenets of Puritanism, and regarding all kinds of secular learning as subsidiary elements towards theological training. Fifty years after the foundation of Yale the first decisive step towards the liberation of knowledge was taken. The University of Pennsylvania, founded on lines laid down by Benjamin Franklin in 1751, led the way in the English-speaking world towards the conception of a seat of learning in which learning should be unrestricted by dogma and have no limits set to it other than the limits of human intelligence and capacity. That foundation, originated by men who were to be the creators of the American Commonwealth, was an achievement in the field of human thought which marks a new epoch, just as the foundation of the Republic a generation later marks an epoch in the political and social life of mankind.

The step then gained has never been lost. More and more surely, as time went on, the declaration of intellectual independence made by those pioneers of the modern world became a profession of faith and a standard of conduct throughout the international commonwealth of learning. Progress was slow: it was not until 1871 that religious tests were removed from the ancient universities of Oxford and

Cambridge; here, as elsewhere, the creators of the United States led the way, and the American Republic followed them in the advance towards a new conception and a new conduct of life. It became, in the full sense of the words, a New World.

That world existed at first, and for long, only as a sketch or outline: it drove its outposts forward through virgin forest or over empty prairie; the advancing tide, however swift its actual advance, required generations to fill up the channels laid for it and widen out into lakes and seas; the foundations were pushed on, here and there, at random, and the earliest superstructures built upon them were often slight and mean. It was not until after the Civil War that the American nation, secure in its unity and conscious of its greatness, began to organise its own higher education, and to realise the full culture of the human faculties as a function of its national life. Since then the growth, in all the States of the Union, of institutions of liberal and technical learning has been rapid and vast. Yet even so, it has hardly kept pace with the enormous growth of population, of civic organisation, and of material resources. The new institution now being inaugurated at Houston is one among many such new foundations, and they will not be the last. The foundations are laid, but the structure towards which they are laid is only begun.

But while the number of American universities is steadily growing, the ideal of an American university is undergoing no less striking and fruitful an expansion. It is being recognised that a university, or any institution of university rank, must have a sphere of study and of influence as wide as the whole width of human activity. It can no longer confine itself to some special study; it can no longer be merely a theological seminary, or a school of letters, or a training-college

of commerce, or a collection of laboratories and workshops. Its function and scope must be universal. It must proclaim the unity of all knowledge, the kinship of the arts and sciences, the mutual interdependence of all study and research towards the conquest of nature and the complete civilisation of man. To this task there are no bounds; beyond the widening frontiers of knowledge lie ever more and more unexplored territories. To the Republic of Learning no limits are set by the ocean. The growth of knowledge is the growth of power; the organisation and communication of knowledge are the organisation and communication of power; and that power is not merely a power over what is known, but a power and a will and an endless purpose to know more.

It is, then, matter of congratulation that the founders of this institution have determined that its studies shall not be confined to any single branch of knowledge, but that the technical and professional instruction which it will offer shall be liberalised by organic connection with art and letters. In the stately and ample surroundings which have been planned, with the large and varied equipment which is being provided, the Rice Institute gives welcome promise of rising to the height of the opportunity presented to it. By a wise munificence, it will offer its education free to its students; it will lay no tax upon the acquisition of knowledge. By an equally wise breadth of view, it will base professional and technical training on a liberal general education, and will thus affirm the human side of science, commerce, and industry, no less than the scientific, commercial, and industrial value of art and letters—of “the so-called humanities,” to quote a phrase from the authoritative statement of its Governing Board, which derive that name from a recognition of the fact that human life, at its broadest and fullest, is the

subject-matter alike of all academic study and of all civic endeavour. It is proposed to assign no upper limit to the educational activity of the Institute; nor, indeed, is it right that any such limit should be fixed except that fixed by Nature herself—the limit of human activity and capacity. But its upward growth will be on broad foundations; its roots will draw life from a large and rich soil; and the hope may be expressed that its lateral radiating growth will, no less than its upward growth, be subject to no imposed limit. For only thus can its full natural expansion be achieved and its organic vitality secured.

Among the “humanities”—among those studies or pursuits in which the noblest instincts of human nature are fostered and its highest aspirations sustained—poetry takes a high, if not the highest, place. As language is the universal and necessary instrument of thought, and as thought is the source and motive power of all action, invention, and creation, so poetry is the organ of language and thought at their highest power, in their most intense and most vitalising manifestation. It will not, therefore, be irrelevant to the inception of a new university to consider more closely, first, what poetry is, and then—a matter of no less moment and of a practical importance which will appear in the development of the discussion—what is the task or function of poetry in the modern world.

II

WHAT IS POETRY?

IN order to discuss anything rationally, we must first have a clear notion of what the thing is which we are discussing. Most misunderstandings, most false opinions, arise from mere confusion; and the heat of debate increases with the vagueness of definition. Even in the sphere of the physical sciences, where perpetual reference back to facts is implied in the nature of the case, and where these facts are visible, tangible, and ponderable, such confusion is not unknown. But the confusion is more apt to arise, and can spread further without detection, in matters where theory cannot be so readily, and has not to be so constantly, brought to the test of experience; where experience itself is fluctuating, and subject to the distorting influence not merely, as in physical science, of tradition and habit, but also of unreasoned instinct and variable emotion. Only by the continuous effort of generations have the physical sciences been brought into the state in which their really scientific pursuit is secured; only by constantly applying them to practical problems can we test the truth of generalisations and the relevance of theories, and be sure that our knowledge is real knowledge, and bears relation—a real and helpful relation—to the actual world in which we find ourselves and with which we have to deal.

In what are called the humane studies—those of art and letters—the same twofold necessity exists: the necessity of a clear definition of terms, and the necessity of testing the value of any study or pursuit by laying it alongside of facts

and seeing what relation it bears to the claims of life. Before considering, as it is my main object to do, the function and task of poetry in the actual modern world, whether as a subject of study, an art in practice, or (more largely) an element in civilisation, it will be proper, and indeed necessary, to clear the ground by saying what poetry is.

In this as in so many other matters the instinctive tendency in many minds is to give to the question, 'What is poetry?' the answer, 'I know, so long as you do not ask me.' And it is no doubt true that most people have some vague and general conception of what is meant by the word 'poetry' floating in their minds. But their conception is so vague and indeterminate as to be of little use. That poetry is a kind of language, differing in its nature alike from the ordinary language of our daily intercourse and from the language used in books of science or philosophy or history, of treatises on politics or economics or religion, of memoirs or essays or narratives, would be generally admitted; but when we go beyond this and ask what is its specific nature, many would be unable to say more than that it is language arranged in lines of a certain arbitrary length, with the words so artificially ordered as to produce an agreeable effect upon the ear, and to excite a certain pleasure, comparable to that produced by music, in the senses of the reader. Beyond that, they would have to fall back on instances: poetry, they would say, is, in ancient literature, Homer and Virgil; in our common English inheritance, Chaucer, Spenser, Milton; in more modern times, Wordsworth, Keats, Tennyson, Browning on one side of the Atlantic, Bryant, Longfellow, Whittier, and a thousand other writers who have succeeded to them, in our own Republic.

But what are we to think of these and other poets, not merely as men, not merely as writers, but as poets? What

is that thing called 'poetry' which they all produced, and what are we to think of it, as an art, as a way of occupying life and affecting the lives of others, as a subject to be studied or a craft to be exercised? When we come to this point we are faced at once with the confusion which arises from the absence of a clear notion of what is meant by poetry, and from the consequent absence of any firm common ground when we try to state and to appraise its function, its value, its relation to the task, the duty, the privilege of actual men and women here in the twentieth century. This confusion affects the eulogists and the detractors of poetry alike. Many wild words are spoken on both sides. It is needless to enlarge on this notorious fact. On the one side are the devotees of poetry, who regard it as something too lofty and sacred for definition, as something that stands outside of and apart from common people and their pursuits. On the other, in much larger numbers, are those who think of it as a rather trifling amusement, suitable for people who have nothing better to do; or even as something vicious and demoralising, something that weakens the mind, destroys industry and accuracy, cultivates fancy and sentiment at the expense of intelligence, and is a stumbling-block in the way of the pursuit of truth. To them poetry is like alcoholic liquor, a dangerous servant and a destructive master. 'One of the Fathers,' says Bacon in his 'Essay of Truth,' 'called Poesy *vinum dæmonum* (devils' wine), because it filleth the imagination with the shadow of a lie.' The churches, and religious people generally, have always, if they did not go as far as St. Augustine, at all events regarded poetry with suspicion, and not been comfortable about it. And here they are, for once, in agreement with the rough common-sense of business men who care for religion as little as they care for poetry. It is easy to laugh at the mathematician who

asked of Milton's 'Paradise Lost,' 'What does it prove?' But it is not so easy to ignore the man in the street who asks of poetry, not 'What does it prove?' but 'What sense is there in it?' It is not so easy to confute, before a careless public, the discontented man of letters who turns against his own art, and says of poetry, in the words of a contemporary of Shakespeare, that it is a thing 'whereof there is no use in a man's whole life but to describe discontented thoughts and youthful desire.' To such minds poetry is either a childish folly or a deliberate misapplication of human powers.

Against such an attitude we may set the many splendid tributes in which, while pretending to give a definition of poetry, the poets themselves have claimed for it qualities so marvellous, a value so great, that nothing else in life is so precious. Wordsworth calls poetry 'the breath and finer spirit of all knowledge.' Shelley calls it 'the record of the best and happiest moments of the happiest and best minds.' Matthew Arnold says that it is not only 'the most perfect speech of man,' but also 'that in which he comes nearest to the truth.' When poets commend poetry, their testimony may be taken by the outer world with some of the suspicion which attaches to people who cry up their own wares. Yet even after making all due allowance for this, the two attitudes of mind towards poetry are clearly inconsistent with each other. We may admit that there is truth in both, as there is truth somewhere at the basis of any widely and sincerely held opinion on matters which affect life. But if both are true, they are clearly not both true of the same thing and in the same sense. In order to reconcile them in any wider and more comprehensive truth, we must try to avoid on the one hand the glitter of rhetoric and sentiment, the 'luminous mist' (in Coleridge's fine phrase) which imaginative artists are apt to wrap round their own art, and on the other hand

the impatience of the practical and unimaginative man with anything that falls beyond the scope of his own daily experience, that uses terms with which he is not familiar and aims at objects which he has not learned to appreciate. And the best way towards arriving at common ground is to define our terms as clearly and simply as possible.

With this object, let us now proceed, not to praise or blame poetry (both are easy, and both are useless), but to explain what poetry is. I will first state the technical definition of poetry; from it, and keeping it in view, we shall be able to frame a substantial or vital definition of it, to define it not merely as a technical term, but as an organic process or function. Like all other arts, poetry has both sides. Like music, painting, or architecture, it is a thing subject to laws which can be taught and learned, historically studied and practically applied. Like them, it is also not merely an art, but a fine art; that is to say, it is a form of creative human activity, bearing an intimate relation with the energies of human nature, and with the outlook of man upon the material and spiritual world.

Poetry is, formally and technically, patterned language. This is its bare and irreducible definition. Its specific quality, its *differentia* from other kinds of artistry exercised on the material of language, is that it works language into patterns and uses it not only for its common and universal purpose of expressing meaning,—not only for its heightened or artistic purpose of expressing meaning in such a way as to express it beautifully and thus satisfy the artistic sense,—but also, and expressly, so as to bring it within the scope, and make it subject to the laws, of that kind of decorative designing which we call pattern.

Some brief further explanation may here be added to make the point quite clear. When we are defining poetry

and separating it formally from other kinds of spoken or written language, it is not enough to say that it is language which possesses design and has decorative value. All beautiful, dignified, and elevated language has that. The quality peculiar to poetry is something different. We may call it, as we choose, a decorative or a structural quality: for what lies at the root of all true art is, that in it structure and decoration are inseparable; each implies the other, and each exists, in any artistic sense, only by virtue of its essential relation to the other. Structure in the abstract, apart from the decorative quality through which it manifests itself to the senses and affects the imagination and the emotions, is matter of science, not of art. Decoration in the abstract, apart from the material in which it is wrought and its relation to the structure which it decorates, is meaningless. The synthesis of the two constitutes beauty; their vital union is the aim of art. Now the specific quality of poetry as distinguished from other kinds of literature is that in construction and decoration (its construction being decorative, and its decoration constructive) it follows the laws of pattern. The essence of pattern, as is well known to all pattern-designers, consists in its having what they term a repeat. Pattern is built up out of, or grows out of, a repeated unit; and the art and skill of the pattern-designer are shewn by his success not merely in making the repeat mechanical, but in so handling it that the whole field over which it extends has a beauty and a unity of its own, rising out of and yet distinct from the quality of the repeated unit. A row of equal dots is a pattern in its crudest and simplest form; these dots may be grouped, and the group repeated; these repeated groups may be themselves regrouped into a larger design, and that repeated; and so on. Not only so, but when the pattern is to be executed by hand and not by a machine, it may be treated

flexibly and varied subtly; it may depart from exact repetition without ceasing to be a pattern so long as the repeat, or its main elements, continue to be felt. All really excellent patterns, patterns which are works of art, have something of this flexibility. It may extend so far that the repeat has to be sought for, is visible only to the trained eye, and affects other eyes with a pleasure which they feel but cannot analyse and do not fully understand.

This is well understood as regards the arts of painting and music. It is less well understood as regards the art of poetry; but it is true of poetry equally with the other arts of pattern. Poetry, according to a definition which in all probability comes to us from no less an authority than Milton, is the kind of language which 'consists of rhythm in verses.' Prose also has rhythm, and its rhythm may be of great and intricate beauty, but it is not 'in verses'; its rhythm is not subject to the law of repeat. It is indeed the essence of prose that it has not a repeat; so much so that when it slips into a repeat it becomes bad prose, and affects us disagreeably. This is what its name means: 'prose'—the Latin *prosa oratio*—means language which moves straight forward without a repeat in its rhythm. Similarly, 'verse' (also a Latin word) simply means repeat.

The distinction then between prose and verse is fundamental. It is not quite the same as the distinction between prose and poetry; for while no prose is poetry (except in a very loose and figurative way of speaking, unhappily not seldom used), all verse is not poetry. All patterned language is verse, but to make it poetry the pattern must be skillfully designed and governed by the sense of beauty. Or, if we like, we may say that poetry and verse are the same, only then we must include bad poetry as well as good. It is simpler to say that bad poetry is not poetry at all. Milton again

here supplies us with an illuminating phrase. In the 'Paradise Lost' he speaks of 'prose or numerous verse.' Verse which is 'numerous,' in which the repeated unit and the way in which the repeat is managed are alike beautiful, is poetry.

The scope of pattern, in language as in all the other materials upon which human craftsmanship is exercised, is very wide. Its development varies from country to country, from age to age, from one school of artists to another; and even the same artist may use it very variously at different times and for different purposes. It suffers alternations of growth and decay: a period of healthy growth is succeeded by one of stagnation and disintegration, out of which again in time fresh growth arises. The condition of decorative art in any nation is, at any time, an index to the state of its civilisation; for art is a function of, or an element in, the whole process of national life. Art in a sense exists for its own sake: but in a more important sense it exists for the sake of the human life in which it is a factor. Just as, amid great varieties and fluctuations of movement, there are traceable certain broad lines of national development, so it is with the decorative arts of a nation, and with poetry among these: there are certain normal or dominant types of pattern; on these each artist varies according to his own imagination and skill; and from the normal and central type extend outwards in all directions other types, continually in process of invention, cultivation, and change. Some of them are experiments which come to nothing; others strike root and become important enough to affect or alter the normal type of pattern. Thus the art of poetry is always renewing itself through fresh invention under the stimulus of individual genius, and always rebalancing itself through a slow but final current of judgment as to the success or failure of the new type. Instances may be found anywhere by even a cursory

glance over contemporary poetry. But we shall be on clearer ground if we put aside living authors and look to the work of an earlier generation, which has already taken its place and can be looked at as a whole and from a distance. Among American poets of the last century we shall find the normal patterns of language, for instance, in the work of Longfellow, perhaps still the greatest, as he is the sweetest-voiced and sanest-minded, of them all. Notable divergences from normal pattern may be seen on the one hand in the lyrics of Poe, with whom curiousness of pattern was almost an obsession; on the other hand, in the singular and hitherto unique work of Walt Whitman, in which the reaction against formalism of pattern went so far that it has been questioned whether any pattern, in the strict sense, is left at all: or in other words, whether the contents of 'Leaves of Grass' are, or are not, poetry.

Poetry, then, according to its formal and technical definition, is patterned language, the material of words wrought by art into patterns; and it gives the pleasure, partly sensuous and partly intellectual, which all pattern gives through, and in proportion to, its decorative fitness and beauty. If we regard it not on its technical side, but in its substance and meaning, it has a corresponding definition: it is the art or process which makes patterns out of the subject-matter of language. That subject-matter is life.

As soon as we have grasped this truth firmly we shall understand the things which the poets have said about poetry. Life, as it presents itself to us as we pass through it, has no pattern, or at least none (except to some people of very simple and fervid religious belief) that is certain and intelligible. It is multiplex and bewildering; its laws are confused; it does not satisfy our hopes or our aspirations: sometimes it seems purposeless, often it seems, as Hamlet

says, 'out of joint.' It makes no pattern; still less does it make a pattern of beauty. The high office, the unique function, of poetry is to compose this disorder into a pattern; to bring out, make visible, lift up as a light in darkness, the particular portion or aspect of life which it touches; and in the hands of the greatest poets, to do this with life as a whole. In the beautiful words of Shelley, which I may now quote with the hope that their significance can be understood, poetry 'makes familiar things be as if they were not familiar.' It shews us the confused, depressing texture of experience in a new and strange light under which we can realise it as part of the divine order. It lets us see life in its inherent beauty and value, and gives us strength to live.

Thus poetry is, in no mere rhetorical or sentimental sense, the highest human achievement. It is the culminating point of that wide combined effort or instinct which is at the base of all education, of all study, of all work; and this is, to realise the potentialities of life, to master the world and enter into our inheritance. To do this is, in the full sense, to live.

III

THE MODERN WORLD

THE present age is in a state of rapid flux. Not in one country only, nor among one social class only, but everywhere from top to bottom and from end to end, change is proceeding with unexampled speed. All movement, not only physical but intellectual and moral, has been vastly accelerated. The old barriers are everywhere breaking down, the old ideas and organisations disappearing, or in course of being fundamentally transformed. An enormous stock of hitherto latent energy has been called violently into action, and to this process it is not yet possible to assign any limit. We live, and our children will live after us, among the wreckage of an old order, and the girders and scaffolding of a new one which is arising, amid dust, confusion, and seeming absence of any mastering control or intelligible design, to replace the old.

The nineteenth century, which now lies so far behind us that we can more or less look back upon it as on a past age and receive from it a general total impression, was an age of ideas, and of belief in ideas. Among its dominant ideas were those of nationality and of enfranchisement in politics, of organic continuity in history, of conquest of the physical world in science. Such ideas, grasped, believed in, and practically applied, impressed upon the century a character of its own, and one wholly different from that of any previous age. They were all summed up and included, together with many others of hardly less significance, in the governing idea of progress. Progress was necessarily accompanied by change;

but change was sought not for its own sake, but for the sake of giving effect to the ideas which lay behind it as a motive force. Change was realised as development: this was the achievement of science. Development was assumed to be progress, and was hailed as such: this was the essence of liberalism. It was an age of unbounded hope for the future and of active belief in the work of the present.

A generation ago, a change began to pass over the human spirit. The reflex action of the new ideas cut them away from the base out of which they had sprung. For ideas, like other things, are subject to the law of development, and pass through an orbit of their own. The revolution of the nineteenth century has, like other revolutions, 'devoured its own children.' Its ideas have partly dwindled, partly failed, partly so altered and expanded that they can no longer be recognised for what they were. The law of development has, in the phrase of engineers, 'taken charge.' In discovering it, we have discovered our master. It is a law not of our making, and but little under our control. Before its march all the old traditions, and all the moral or customary sanctions which attached themselves to these, crumble away or go off in smoke. It is a power not only invincible, but incalculable. We may still talk of progress; but many of us have in our hearts ceased to believe in it; or if we do believe in it, it is a different thing in which we believe from that progress which quickened the impulses and inspired the actions of our predecessors. Progress meant to them betterment. It meant the coming of mankind, with certainty and with increasing rapidity, into their inheritance; and that inheritance was assumed, or believed, or as men thought, proved, to be a goodly inheritance, to include in it all good. The inheritance which we now see lying before us seems rather a burden than an enfranchisement. It is an 'importunate and heavy

load.' Long ago, the greatest of the Hebrew prophets cried out sorrowfully to the Power which ruled above, 'Thou hast multiplied the people, and hast not increased the joy.' Some such feeling now weighs upon the present age. The Power goes on its own inflexible, sinister way, and forces us on before it. We find it more and more difficult to believe that it **works** for good; for we do not see it doing so. There is a **wide-spread** belief that progress, in the old sense of the word, does not exist.

The denial of progress, as a ruling law of life, has also been a doctrine held in past ages. But they differed from the present age in this, that they carried out their doctrine in practice. They were conservative. They tried, with all the power they had, to fix things as they were, lest a worse thing should come upon them. This was the whole effort of the Middle Ages. It was the effort of the conservative or reactionary element in society which strove, persistently but in the end helplessly, against the intellectual revolution of the eighteenth century, the industrial revolution which succeeded it, and the political, scientific, and social revolutions which have carried on the process down to our own day. But conservatism in the old sense has also ceased to exist as a real and effective doctrine. Change has been realised as an invincible force; the desire for change has become a fixed instinct; and to this, rather than to any reasoned belief or any assured hope, is due the intense restlessness of the modern world.

The solvent effect of many forces has co-operated to bring this state of things about. Intercommunication in space has reached such a pitch of ease and regularity that the communities of mankind are no longer cut off from one another; what affects one, almost at once begins to affect all, and an impulse towards change arising anywhere from fresh

ideas or altered circumstances is propagated, as it were by waves travelling in all directions through an elastic medium, over the whole world. An immensely increased knowledge of the past has come to men from the compilation of records and the organisation of research; and the historical method (perhaps the greatest single invention of modern times) has interconnected all that knowledge so as to make it breed and multiply through mutual fertilisation. Knowledge and understanding of so many past changes has brought about an attitude of mind in which nothing is seen to be unchangeable, in which no change seems impossible, in which life itself appears to consist of change. The development of applied science and the triumph of machinery have opened up a boundless prospect of the degree to which this inherent law of change may be utilised, may be turned by mankind to planned ends and foreseen purposes. Together with all these solvent influences is to be reckoned another, negative indeed, yet in its effect perhaps the most potent of all. This is the disappearance of religion, in the older and original sense of the word. For religion as it was understood in earlier ages was a system of enactments and prohibitions based on undefined fear and sanctioned by terrible penalties; once established, it was the strongest of all conservative forces, because exercising the highest and widest controlling power over the thought as well as the actions of men.

The joint result of all these solvent influences in their accumulated force is a movement of change so rapid and so wide-spread that all the old framework of life tends to disappear, and no pattern of life is left. The course of change points everywhere, which is the same thing as pointing nowhere. The compasses by which life was directed have been demagnetised. It is an age of perplexity, an age of disillusionment. This is not like the old clearing up of thought

(the *Aufklärung* of philosophic historians) which sought to dispel illusions that had gathered round and blurred a framework of certainty. It is disillusionment in another sense. Its light is a blind and formless glare in which all objects disappear. It issues in the feeling that what is to be discovered is infinite and cannot be discovered fully; that what is to be done is infinite and cannot be done effectively.

Against this relapse into chaos what is needed is a steady-ing influence; and this influence, while it may arise from different sources and act along many channels, is to be sought and found nowhere with more clearness and certainty than in poetry. For it is the function of poetry, as we have seen, to make patterns out of life; to discover by its imaginative vision, to make manifest by its creative and constructive power, the order and beauty, the truth and law, that underlie the flux of things. To the paralysing sense of disillusionment it opposes a revelation of essential truth; beneath the chaotic surface of life it apprehends ordered beauty. It re-creates the fabric of life; it renews the meaning and the motive of living.

It would be needless, in speaking to any educated audience, to multiply instances in which this function has actually been performed by great poets, or to point out how their quickening and reconstituting influence is not confined to their own fellow-countrymen in their own age, but retains or may even increase its effect in distant ages and among other civilisations. All the great poets of the past derive their greatness for us in the present from the fact that their effective force on life still survives. The religious poetry of the ancient Hebrew people, translated into other tongues and reinterpreted by new minds, remains a dominant power not merely among the wide-spread colonies of their own descendants, but among all the nations who have received

it as part of the inheritance of Christianity. Homer, the poet of poets who wrote the Iliad and the Odyssey, was the *teacher and in some sense the creator* (so the Greeks themselves claimed) of ancient Greece; but after ancient Greece had perished, and ever since, down to the present day, he has remained a powerful influence over the ideals, and thus over the conduct and action, of successive generations of mankind. Virgil, the prophet and interpreter through his poems of the Latin race and the Roman Empire, shares with the Roman statesmen, jurists, and administrators the glory of having formed and transmitted to posterity the plan of an ordered civilisation reigning throughout an organised empire and imposing itself on the outer surrounding world. The great poets of England and the English-speaking nations have, on one side or another, achieved a task hardly less. Chaucer interpreted and summed up the expansion given to life by the earlier Renaissance; he initiated modern England. Spenser gave voice to the ideals and inspired the action of the Elizabethan age. Milton engraved upon the minds of his countrymen (and among those countrymen were the Fathers of the American Republic) the doctrine, the belief, the law of conduct, which were the strength of Puritanism and the basis of Republicanism. In more recent times the poetry of Byron and Shelley carried on the work and enforced the ideas which, through the French Revolution and the movement of which the French Revolution was the symbol and centre, transformed the civilisation and life of Europe. The Brownings became, a generation later, the interpreters of that Liberalism which, in the social, political, and industrial world, was the chief motive force of the nineteenth century. In the middle years of that same century the group of American poets among whom Longfellow, Whittier, and Lowell are the most distinguished names, exercised

the most powerful influence over national life, and share with Lincoln and Grant, with soldiers and statesmen and men of action, the glory of creating and sustaining that faith and that resolution among the people which saved the Union and established a free and indissoluble Commonwealth.

Poets have not ceased; and there may be poets now alive whose work in the judgment of future generations will be comparable in the history of the world to that of their great predecessors. Whether this be so or not, the task and function of poetry remain the same; and thus the study of poetry remains an essential part of human culture, and its practice an essential element in human activity.

Among the great poets, as among all great artists, there is very wide differentiation of function. While they all, in virtue of being poets, create or embody patterns of life, these patterns are never twice the same; they are the creation of individual genius working on material which, being coextensive with life itself, is of infinite complexity and variety. In the phrase of St. Paul, 'there are divers interpretations, but one spirit.' The interpretation is never twice the same; the material to be interpreted never presents itself to two artists alike. Hence the task of poetry is never completed; it is a concurrent and endless integration of the meaning of life; and while the poetry of the past is our priceless inheritance, the poetry of the present is our ceaseless need. Some poets have been, primarily and distinctively, prophets of the future; with others, their work has been to reillumine the past and make it alive to us, to make it an effective part of our own conscious life. Others, again, have brought form and beauty into the present, and shewn us the pattern in the things that lie nearest to us. Thus Tennyson owed his vast influence and popularity to the fact that he was always just abreast of his time; he was the voice, during the

sixty years of his poetical production, of the actual spirit of his country, the thought and emotion and work of his age. Other poets as great have failed to obtain the same universal acceptance, because the patterns of life they created were of a life somewhat further apart from common experience: such poets may have to wait for their fame until after death, or may exercise their influence not so much on the world of their own time directly as on a smaller number of minds whom they inspire and fertilise, and through whom they become powerful germinal influences on a later generation. To elucidate and appreciate this complex stream of creation and its effect upon mankind is part of the study of poetry: but more than that, it is part of the study of civilisation, part of the equipment required for understanding the world and being able to deal with it, to master its springs and to sway its course.

The state of flux which I began by noting as characteristic of this early twentieth century is perhaps nowhere so marked and so rapid as in the United States. From its beginnings, and now as much as ever, the American Republic has been the laboratory and testing-ground of the whole world. The founders of the Republic set themselves to make that continent to which the name of the New World had been applied since its discovery and colonisation, a new world in the full sense; and this has remained more or less, in principle at least, the guiding doctrine of their successors. But in the framing of a pattern for this new world, poetry and the poets (except, as I mentioned, in the course of the great struggle which established the freedom and unity of the nation) have borne little part. The creators of the United States were neither poets nor much influenced in their thought and action by poetry. Washington, Franklin, Hamilton, all had a certain amount of imaginative or creative

genius; but they had minds of the prosaic, not the poetical order. The poetry of Puritanism had, a century before their time, put forth its first and last flower in Milton; unless we say that, half a century later still, the thin and austere but exquisite poetry of Emerson was a last autumnal flowerage from the same stem. There are many modern American poets, but no one among them has been recognised by the world as belonging to the first rank, or appears to be a moulding and formative influence over the national life. Of the two names whom many would hold to be the foremost among American poets, Poe was a stray exotic, and Whitman a splendid anomaly. Perhaps the national life is more confused, certainly the national history is poorer, through the comparative absence of poetry—of a national and great poetry—as one of its constructive and enriching elements. And in the solution of the vast problems which to-day confront the Republic, those patterns of life given by the poets, whether native or foreign, cannot be neglected without grave loss. It is necessary to maintain, it is at once a privilege and a duty to urge, the study of poetry as a part of the public provision for the education of the people.

This new Institute, like most modern foundations for promoting higher education, devotes itself largely or mainly to technology and science. This is quite right; for these are studies of immediate utility and pressing importance. But did it confine itself to these, it would contract its own scope and diminish its own value. Technical processes are means and not ends in life; physical science itself is based ultimately on ideas: letters and art give it not merely its interpretation, but its impulse and inner meaning. Thus the study of the humanities is at once the basis and the crown of the study of the sciences; or rather, we may say, supplies these sciences with a motive and an informing spirit.

The humanities, the studies which deal directly with the vital and human elements in life, with thought, emotion, and imagination, culminate in poetry; and we may now proceed to consider somewhat more closely and more in detail the function and task of poetry in relation to actual life at the present day. The modern world, as I said, is in a state of rapid flux and transformation. Among a thousand elements or forces which go to make its movement, one or another may be singled out as of special prominence. But there would be general agreement with any one who called the present age eminently an age of the extension and dominance of science; or who called it, no less eminently, an age of business conducted on a vast scale, at high tension, with exceeding complexity; or who, once more, called it the age of expanding and triumphant democracy. Let us proceed to regard the function of poetry in relation to these three great distinguishing features of the actual world.

IV

POETRY AND SCIENCE

SCIENCE, as the term is now understood and as the study denoted by the word is now pursued, is a birth of the modern world. Its growth was coincident with the earlier development of the United States, where its practical application has expanded to keep pace with the ever increasing demands of a national growth more swift and complex than has elsewhere been known. Within the last two or three generations it has also taken its place as an important, and even an indispensable, part of higher education. Technical institutes have sprung up on all sides in response to public demand. The study of science has been taken up by the older universities, and is the main pursuit in most universities of modern foundation. Even higher claims are made for it. Its exponents speak of it not only as having won an assured place in the front rank of human studies, but as occupying in that rank a predominant, if not, as some of them venture to assert, a practically exclusive place. A note of triumph is sounded in these utterances. The Royal Society of England has this year [1913] been celebrating, with splendid ceremonies and before audiences containing many of the foremost names of the present age, the two hundred and fiftieth anniversary of its foundation. In connection with these meetings, the importance and dignity of science were asserted in these eloquent words:

‘Our children are born into a time in which science has already ceased to be a plaything; it has become, or is fast

becoming, the dominant factor in human affairs; it will determine who shall hold the supremacy among nations.'

So far, the note is one of exultation: yet the satisfaction of those who urge the claims of science is not complete. They complain that science is not yet studied as it should be; that other studies, whose value is inferior and whose day is over, are allowed to encroach on a field and share an authority which ought to belong to science alone. 'It has as yet,' the writer from whom I have just quoted goes on, 'no adequate place in the intellectual equipment or in the education of those who aspire to be the governing classes of the country.'

This sentence is significant in more than one way. Whether or not there are to be governing classes in the country—be that country England, of which the words were spoken, or America, to which they likewise apply—is exactly the problem which lies for solution before modern democracy. But however this may be, whether the nations will hand over their government to a trained class, or whether, according to the ideal impressed upon the United States by the founders of the Republic, the governing power shall comprise all classes and be the whole organised body of a self-governing nation, the claim is in either case made that science in its modern sense is to be the staple of their intellectual equipment.

Part of this claim has been already conceded. Immense endowments are lavished on scientific research and study. The axis of education has been sensibly shifted. Science has taken its place as an integral part of school and university education. The scientific methods of observation, record, and experiment have been introduced into other studies, and the scientific spirit, developed through the pursuit of the sciences, has become a general instrument of human culture.

Unhappily, however, this great and beneficent change has not taken place smoothly, or without grave conflicts and violent misunderstandings. Partly from exaggerated claims made by enthusiasts for the new learning, and still more *largely from a narrow and obstinate conservatism among the supporters of the old*, friction has ensued which is as needless as it is prejudicial. The idea has grown up that science is in some way opposed to art and letters. The unity of all knowledge, the co-ordination and mutual support of all human effort, has been lost sight of on both sides in this controversy. On one side were vested interests, old traditions, the jealousy with which innovations are apt to be regarded by those whose minds have been set in a particular pattern, and who cannot shift their perspective to the changes which the course of time brings about. On the other side were a revolt against the domination of these inrerests and traditions, a rejection of the stagnation involved in mere conservatism, and a necessary assertion of new needs and new methods of meeting them. But together with these came also an impatience of the past, an outlook narrowed by its own eagerness, and a recurrence of the belief that the path of progress lies in one, and in only one, direction. The fancied opposition of science to art and letters, and more particularly to poetry, is injurious to the general interest of mankind, to which all more special interests are subordinate. In a national life which executes its functions fully, science and poetry will not be in conflict, but in co-operation. Each corresponds to a need of life; in the full and harmonious development of life each reinforces the other; and in any sound system of national education both have their place, their proper and indispensable function.

We may regard this co-operation from either point of view: that which has primary regard to what poetry gains

from science, and that which looks, conversely, at what science gains from poetry. The creative instinct, the imaginative impulse, which find expression in poetry, are powerfully reinforced by the discoveries of science and by the growth of the scientific spirit. For that spirit affects the whole field of mental activity. The discoveries of science present the creative imagination with an ampler, richer, and more wonderful world; the spirit in which they are made and the methods by which they are pursued give a greater insight into that world. The scientific imagination is akin, though it works in a different field, to the poetic imagination. Both are creative energies; both work towards bringing out the organic laws of truth or of beauty which underlie the structure of man and of the universe in which man finds himself. The poetic imagination is, or ought to be, kindled by the work of science. The scientific imagination is, or ought to be, kindled by the work of poetry.

If we look to history, instances will at once occur where this conjunction has actually taken place. Ancient Greece invented science and perfected the art of poetry; and the development of Athenian poetry into what became, and still remains, the delight and wonder of the world, was coincident with the first growth, among the same race and in the same civilisation, of scientific enquiry, that is to say, of the search into the meaning and connection of things. The physical sciences were no doubt then still in their infancy; but the impulse towards them had been created and went side by side with the more patent and wide-spread impulse towards the scientific study of language and the operations of the human mind.

So too, at Rome, the great poem of Lucretius, in which Latin poetry for the first time reached its full stature, was inspired by the Epicurean philosophy; and that philosophy

was not only a system of ethics and a rule of life, but was—and was thereby distinguished from other philosophies—a systematic and brilliant attempt to solve the laws of nature and apply scientific principles to the construction and working of the physical universe. This scientific ardour was fixed by Lucretius as a poetic ideal. It was transmitted by him to his great successor in poetry. Virgil, in the celebrated passage where he gives utterance to his own ideal of life, prays that the Muses whose servant he is may before all else instruct him, not in the beauties of what is called a poet's world, river and woodland and a pastoral Arcadia, but in the 'causes of things,' the structure and law of the universe. Beyond poetry and beneath it lay the magnificent revelations of science; and only through the mastery of science could man enter into his inheritance, conquer fate, and dispel fear.

Once more, at the Renaissance, poetry and science found themselves working in close union. Each had a new birth; each gave the other mutual stimulus. Milton, in whom English poetry culminated, and who represents, for us as for his own time, the classic standard in poetical art, was a profound student of two sciences which in his age were making immense advances—those of music and astronomy. His scientific knowledge enriches and gives fibre to his whole poetry. In the 'Paradise Lost' he mentions only one of his contemporaries by name; and that one, it is significant to notice, is not a man of letters, but the most eminent man of science of that generation—the physicist and astronomer Galileo. Had he lived two hundred years later, we may guess that the name he would have chosen for this proud eminence would have been that of Darwin. Christ's College in the University of Cambridge, where both Milton and Darwin received their education, has lately been celebrating the memory of both. In that double celebration we may see

vividly not only the continuity and interconnection of learning, but the kinship of poetry with science, and the ideal of a university.

The expansion of science in more modern times has been concurrent with a similar expansion of poetry. The difficulty which both poetry and science have now to face lies just in this immense expansion of their field. Material accumulates faster than it can be dealt with. It is the day of the specialist both in science and in the art of letters. Against the narrowing effect of over-specialisation in his own particular field, the only safeguard is that width of outlook which is gained by grasping life as a whole, by mastering its pattern, as that pattern is discovered by the investigation of men of science, and is re-created or reinterpreted by the poets.

What poetry gains from science is strength and substance, a closer contact with the truth of things, and the power given by the use of a trained intellect. What science gains from poetry is something more impalpable, but not less important; it is what a French scientist calls *élan vital*; it is the impelling and organising force of ideas and imagination. Without ideas, pure science is little more than a record of facts. Without imagination, applied science is sterile. The earliest scientific theories were expressed in the imaginative forms of poetry: the latest are the application, to enormous masses of facts gathered through observation and experiment, of what may be almost called a creative insight, akin to, and based on, that imaginative power which is the essence of poetical creation, and which is fostered by the study of poetry. For by studying poetry we become partakers, to some extent and according to our powers, of the genius of the poets; we develop our own power of creative imagination. Now this creative imagination is not a separate fac-

ulty, shut off from the rest of our faculties. If it is treated as such, the results are disastrous: much of the suspicion and dislike with which poetry has been regarded among men of science is the natural result of a claim arrogated by men of letters, or by people brought up in the tradition of a time before science was recognised as a part of human culture and before scientific method had been applied to all the processes of life, that art and letters were the only sphere in which the imagination can work. But it remains true that it is normally through these that it is first kindled. It remains true that the study of science is most effectively pursued by those who approach it with an intelligence made sensitive, an imagination quickened, by the patterns of life created by poets and the pattern-making power which the study of poetry develops.

If there are defects in the present system of American education, they are due, according to the judgment of many thoughtful observers, to the fact that it hurries towards results without the wide preliminary training which develops the powers of the mind on all their sides. So far as this is the case, it condemns men to work with inferior tools, with an inadequate mental equipment. The result is like that of an engine racing: the mind is not in gear with the whole system of its surroundings, and much of its work is wasted. Energy and capacity are there in full measure; but the capacity has not the proper field to deploy itself in; the energy is forced to run in contracted channels, or, beyond these, to run to waste. Let me quote here the striking words used recently by a distinguished man of science and one of the most zealous advocates for giving science a primary place in national education.

'Several Americans have told me,' says Mr. A. E. Shipley, 'that comparatively few things are actually invented in

America, that most inventions come from abroad, but are eagerly taken up and exploited in the States. Where the American really shines is not as an inventor, but as a manufacturer. It is a striking fact that originality is rare in America, and I think it must be accounted for by the educational system. It stifles originality.'

This is a grave charge; but so far as the defect actually exists it should be realised, and so far as it is realised it can be remedied. We need to lay stress—and stress is being effectively laid by nearly all educationalists—on the necessity and value of scientific training for those who are destined to pursue art and literature. We need to lay stress likewise—and this need should not be neglected or postponed—on the necessity and value of literary and artistic training for those who are destined to pursue science. But to put it so is to state the case inadequately. For it is only a minority in an educated nation who will do either, whose life will be devoted wholly either to literary and artistic, or to scientific pursuits. Not only for these two limited classes, but for the whole of the nation of the future, the ideal which rises before us is that of an education developing all the faculties in harmony; of a nation brought into touch with the facts of Nature and her laws, and into touch no less with the best of what has been thought and felt by mankind and with its noblest and most beautiful expression. And this last is given us by poetry. Nature, as Bacon said, is conquered by obedience; and science teaches us the laws to be obeyed and the mastery over Nature which may be achieved by this obedience. Life is grasped and ordered by imaginative insight; and poetry teaches us the pattern of that order, and creates in us a new meaning, a new beauty and value, for the world and for ourselves.

V

POETRY AND BUSINESS

ONLY a few dedicate their life to the pursuit of science, only a few to the pursuit of art and letters. But we have all, in a greater or less degree, to do business. In it we have, directly or indirectly, our means of subsistence and our current occupation. Business is the substructure of life. A scientific community only means a community in which certain persons (comparatively a few) work systematically at science. They record their inventions or discoveries; they communicate the results of their research and the stimulus of their enthusiasm to others; and thus a certain secondary scientific knowledge, a certain appreciation of the scientific spirit and a large power of using scientific results, reaches through the mass of the people and colours the national life. A literary and artistic community only means a community in which certain persons (these also comparatively a few) do creative work in art and letters, and in the main body of which there is a certain appreciation of that work, and through it of the art and thought of other centuries and ages likewise. But a business community means one in which the whole mass and body of the nation, with insignificant exceptions, is engaged in business as its daily function, in which business is the staple of the national activity.

The United States are the greatest business community in the world. Industry and commerce have been, from the earliest days of the Republic, the chief pursuits of the nation, those to which it has applied itself constantly and

eagerly, upon which it has grown and thriven. On them the whole social fabric has been built up. With the vast increase of wealth due to expanding population and increased power of handling or creating material resources, the energy of business has kept increasing likewise, and its claims on life have become more and more imperious. A sort of fury of industry set in with the extension of the nation over the Middle and Western States, and just at the same time the great discoveries of applied science began to be made which have increased a hundredfold the control of man over nature. After the Civil War the reunited nation plunged into the business of material development on a scale and with a passion until then unknown in history. The business to be done multiplied faster than the hands who were there to do it. Everything became speeded up. Business encroached on all other national activities, and threatened to overwhelm the whole of life. Against this over-encroachment the national conscience is now beginning to rise up, and to reassert the claims of a smoother, less hurried, less perplexed life, not loaded down and breathless under the weight of its own machinery, but using that machinery towards ampler ends—as its master, not its slave.

Poetry and business may seem to have little to do with each other; or their relation, so far as any exists, to be one of mutual dislike and antagonism. Business methods are not the methods of art. The man of business is apt to regard poetry with contempt; and his contempt is fully reciprocated by many followers of poetry. Yet if both are necessary elements in civilised life, there must be some understanding to be come to between them, some harmony attainable. No poet can afford to neglect the machinery of industry; for by means of it he, like all other men, lives. But neither can the man of business afford (if he knew it)

to neglect poetry; for in it the life which he, like all other men, lives receives its meaning and interpretation. Business is a means, not an end. Its uses are necessary and great; but they require to be adjusted to ends beyond itself, beyond business for its own sake, if the life of the business man is to be one in which the full human capacities can be worthily employed. If his life is not touched and uplifted by imagination, he is the slave of business, and not its master.

For some, indeed,—and more perhaps in America than elsewhere,—business is more than an occupation: it is an art, and its exercise has a quality which might almost be called creative. The born man of business loves it for its own sake; and love implies some sort of ideal, some sort of exercise of the imaginative as well as of the practical faculties. Or we may rather say that the imaginative faculty, checked elsewhere, and not finding its natural outlet, forces itself into the one channel left open for it, and to some extent informs the life of business with ideals of its own, not to be scorned or denied, however short they may come of the higher and larger ideal. Without some such imaginative touch upon it,—and the touch is at best imperfect and rare,—how grey and joyless the purely business life is; how purposeless it seems in moments of serious reflection; how prosaic a world it offers! It keeps the world going, but at what a waste of the energies engaged on that laborious task! Let me quote what was said, sixty years ago, by an able man of business, a master of the theory and practice of finance. 'By dull care,' he wrote, 'by stupid industry, a certain social fabric somehow exists. People contrive to go out to their work, and to find work to employ them; body and soul are kept together. And this is what mankind have to shew for their six thousand years of toil and trouble!' These words of Bagehot are as true now as they were then. The human

race want more than to keep body and soul together: they want, and claim, not merely the continuance, but the fruition of life. Machinery to keep the world going is necessary; but it is not necessary, it is not right, that it should be kept going by turning masses of the nation into mere parts of the machine. For this would indeed be, in the noble line of a Latin poet, *propter vitam vivendi perdere causas*, 'for the sake of life to throw away all that makes life worth living.' It was not for this that man was created. It was not for this that the rights of man were asserted. To be enslaved to business is no less servitude than to be branded with the name and work at the caprice of a slave-owner. And as with the chattel slavery abolished by the Republic half a century ago, so with this subtler but equally real slavery to business (whether forced on the individual by circumstances or adopted by him of his own will under the illusion that it will bring him the real wealth of life), the evil effects spread far beyond the slaves themselves: they contract, degrade, and vitiate the whole life of a nation.

In common speech, as in popular thought, business is opposed to pleasure. This is highly significant. So far as the opposition represents a fact—and if it does not represent a fact, how are we to explain its prevalence, its being taken everywhere for granted?—it means that the unity of life has been lost. Business that does not bring pleasure with it, and in it, is only drudgery. It sustains life, but the life which it sustains is thin and barren. It accumulates wealth, but the value of wealth depends on the use made of it, and national, like private, riches are but the substructure of national well-being: they are the means of living, not the object of life. To bring business and pleasure into their true relation, business must be elevated from a mechanism into an art. This is not done by legislation: it is done by the self-realisation of

the human spirit. Towards this self-realisation poetry works; and therefore a nation needs poetry.

Business, or industry, has two sides—production and organisation. In order to elevate it into an art it must be carried on with pleasure and for the sake of pleasure. For this is the definition of art: it is production with pleasure and for the sake of producing. The pleasure of production is given by the pattern or ideal in the mind of the producer. And similarly, the pleasure of organisation is given by the pattern or ideal in the mind of the organiser. Now the function of poetry, as we have seen, is to create patterns or ideals of life; and the study of poetry means the reception into the mind of these patterns of life created by the poets, and their assimilation by the sympathetic instinct which they awaken. Thus received and assimilated, they fertilise life and make it fruitful; they make industry into a conscious pleasure. The beauty and the joy of life which they embody become part of our own life. Our industry becomes truly creative; our business is not carried on as a burden, but exercised as an art. Work and enjoyment are no longer contrary forces tearing our life asunder between them. Poetry, through the patterns of life created by the great poets, will raise us above our own lives, give us spiritual control over them, make the conduct of them no mere mechanical keeping of things going from day to day, but the daily exercise of faculties through which we are partakers in a full humanity.

Poets are often called dreamers, and some poets have been such. For the making of poetry is, like the other arts, also an industry; and, like other industries, it can be pursued mechanically: the poet may become absorbed in the workmanship of his art, and practise it, as the business man may practise his business, from mere habit, when he has lost the vital energy of creation. Or, like other ways of life, it can

be pursued with too much absorption; and, cutting itself away from the deep roots of thought, emotion, and experience, it may become a tissue of fantasies where the creative or imaginative powers have been working in a vacuum, and the patterns of life which they produce dissolve in the very act of forming themselves; as in some witch's weaving, 'the web, reeled off, curls and goes out like steam.' Nor is the study of poetry free from the same danger. Those who neglect business, which is the foundation of life, and conduct, which in the famous phrase is three-fourths of life, for the mere study of poetry as an art, may still find in that study both pleasure and occupation; but when thus cut off from what should be its foundation and substance, such study degenerates: it is apt to turn into the assiduity of the pedant or into the busy idleness of the dilettante. For those who content themselves with it—and all the more if by it they drug themselves into unconcern with activity and duty—the censure of the practical man of business is justified, and his contempt intelligible. They discredit the study of poetry by studying it wrongly. Not one of the least important functions which an institution of higher education fulfils is to direct and organise this study so as to make it really fertile, and to combine it with other studies in the scope of a training at once liberal and practical. The product of such institutions, so far as they succeed in doing what they set out to do, will be men and women nurtured among the ideals of thought and art, made sensitive to beauty, quickened by sympathetic intelligence, yet not so the less competent, but the more, to take their share in the business of the world, in commerce or finance or industry. A generation so equipped for life, and sent into it with the whole range of their faculties so developed, will not only keep the world going, but will raise the whole national life to a higher plane. They

will be in the highest sense good citizens: and in the goodness of its citizens lie the excellence and the true greatness of the state.

The ideals of citizenship include in them nearly all the lesser or more partial ideals aimed at through the specialisation of faculty on particular pursuits. By their wider scope and larger outlook they connect and balance these others. It is the privilege, as it is the duty, of a community which through the labour of past generations has conquered and cleared a dwelling-place for itself, to set in order and beautify its house. The pursuit of riches, of material comfort, even of greatness, is with the nation, as with the individual, a pursuit upon which the whole of life should not be spent. Until now the Republic has had her hands full with a great, necessary, and engrossing task—that of creating a nation, of organising a commonwealth, of bringing the resources of a continent under her control and asserting her place and dignity in the world. Upon that vast structure the spirit of beauty must be breathed, into it the patterns of noble thought, action, and emotion must be brought, to make the Republic of the future fulfil the plan of its founders, and justify the vast labour that past generations have lavished on building it up into material stability.

POETRY AND DEMOCRACY

THE suspicion or dislike with which poetry is regarded by practical people, however unjust or exaggerated, has its reasons, and has existed in all ages and under all organisations of society. But in a democracy poetry lies under another special charge, which if made good against it would be fatal. It is regarded as the amusement of a leisured class, as something savouring of an aristocratic society. Art and letters as a whole share in this charge, but it falls on poetry with special force. Some kinds of literature have an obvious popular interest and make an obvious appeal to the mass of the nation. Some of the fine arts are applied directly, like architecture, to the public service, or directly affect, like music, the sensibility of massed audiences. Others are excused, rather than approved, because they employ labour, encourage special industries, and produce tangible material products. This is not the case with poetry. It stands or falls on its own merits, in its own inherent virtue.

But poetry is a function of life; and where life is organised under democratic standards poetry is, or should be, a function of the democratised nation. Much of the poetry of the past has been produced by and for a small cultured class. In aristocratic societies such a class was the pivot and guiding force of the nation; in it the imaginative ideals and the creative instincts of the whole people were concentrated, or, so far as they existed elsewhere, were used by it for its own purposes. The rest of the nation was but the soil out of

which that flower grew, or the fuel consumed to give the *ruling class sustenance, ease, and material force ready to its hand*. The public conscience now demands that there shall be no ruling class, but that all shall be fitted to rule. The aristocracy of intellect is subject to the same vices, and falls under the same condemnation, as the old aristocracy of birth, or the cruder modern aristocracy of riches. The ideal of democracy—far, indeed, yet from being realised, but felt everywhere, alike by its opponents and its followers, as a pressure steadily moving mankind in a particular direction—is that culture, like wealth and leisure, should be diffused through the whole nation. It abolishes the distinction between active and passive citizens, between a governing caste and a governed people. That is its political aspect. But its larger and nobler ideal is that of a community in which not only the task and responsibility of setting its own house in order and swaying its own destinies, but the whole conduct and development of its own culture, shall be universally shared; in which not only government, but life in its full compass, shall be conducted by the people for the people; in which the human race shall be joint inheritors of the fruits of the human spirit.

Only once, and among a single people, has this ideal been partially realised in the past. The democracy of Athens set no less an aim before itself, and for a brilliant moment seemed to have attained it. Poetry and art reached their climax there together with democratic government. It was the boast of Athens that culture no less than political power was shared by all her citizens. Poets and artists drew from that national atmosphere the creative and imaginative power which they embodied in their work, and returned to the nation in visible and immortal shapes the patterns of life with which the nation had inspired them. But the Athenian

democracy rested on insecure foundations. Like so many *bright things*, it came quickly to confusion, leaving behind it only a memory and an ideal to inspire all future ages. Many centuries had to elapse before the ideal of a civilised democracy was again raised as a standard before mankind by the founders of the American Republic.

The crimes and follies of the Middle Ages, it has been well said, were those of a complex bureaucracy in a half-civilised state. It is towards the end of the Middle Ages that we find the beginnings of national self-consciousness, and, with it, of democratic poetry, embodying patterns of national life. Nor was this all. As the inchoate or embryonic democracy began to be conscious of itself, it began also to be conscious of art, even when that art was the art produced among and for a limited class. As it began to be civilised, it began to have sympathy with the products of civilisation, and to take, if not yet to assert, some share in them. The ideal world of romance and chivalry opened out before it as something in which it could find patterns of life for itself. A common and universal religion, which in theory at least recognised no distinction between classes, between riches and poverty, between prince and people, gave a wide popular basis to all the arts which were employed in its service. Education began to leaven the community. Poetry sought and found a wider audience. Shakespeare produced his plays not for a literary class nor for a court circle, but for the populace of London who flocked to see and hear them. His own sympathies with the people have been doubted or denied; he seems, in the mouths of his characters, to speak of them with something like contempt. But he gave them a national drama. Even the epic, that stately form of poetry which has thriven in the courts of princes and deals with the high actions and passions of the

great, became in a wider sense national. The verses of Ariosto and Tasso, court poetry written for a highly-educated aristocratic circle, were sung by Venetian gondoliers and Lombard vine-dressers, as those of Pindar had been sung in ancient Greece by fishermen, and as those of Virgil are found scrawled on street walls in Pompeii. In England, Milton, a poet of profound learning and extraordinary technical skill, was read and appreciated not only by scholars or artists, but widely among a people whose study of the Bible had introduced them to literature and taught them in some measure to appreciate poetry. His genius penetrated and inspired the Puritan democracy; and though his own republicanism was of a severely aristocratic type, he may be called in some sense the source of republican poetry. For, once poetry had taken to do with the fate and destiny of mankind itself, it had to concern itself with the life and labour of the people as the main factor in human affairs. It found the reflection of the kingdom of God in the commonwealth of mankind. The freedom of God's ransomed drew with it as its consequence a freedom which was of this world. The equality of men before God bore with it their equality of rights and dignity here. The brotherhood of all God's children led on to the doctrine of a true fraternity, not only religious but political and social likewise, linking together all members of the human race.

The eighteenth century, that great germinal age of the human spirit, the age in which not only the American Commonwealth but the modern world was created, was one in which poetry held itself back. It was waiting for the shaping of the new structure of life: the task lay before it of fashioning that structure into new imaginative patterns, and giving it thereby organic form and vital interpretation. Towards the end of the century this preliminary work was well

on foot: the new world was taking substance, and lay ready for the transforming touch of the poets. The American Revolution had created the Republic. The French Revolution had shattered the old régime and its tradition in Europe. The Industrial Revolution was transforming the whole mechanism and texture of civilised life. In both continents a new world had begun. It was the world of the Rights of Man, of the *carrière ouverte*, of the sovereignty of the People; and into this world poetry let itself loose, to create, to interpret, to vivify. The idea of democracy had arisen among the thinkers and been translated into action by the statesmen; the patterns of a democratic world began to be wrought out by the poets.

Among the great English poets of that age, the greatest, in the combined mass and excellence of his work, is generally accounted to be Wordsworth. He divined the new age, but did not enter into it. His early democratic enthusiasm, chilled by the terrors of the French Revolution, became converted first into despair, and then into a search, in the recesses of his own mind, for ideals of life independent of external things. Yet he was the first, after Burns,—and Burns was then still only the poet of a small nation, not of the English-speaking race,—to link poetry with the requirements of nascent democracy. In his 'Lyrical Ballads,' as in the poems which succeeded them during his greatest period, he set himself expressly and deliberately to write poetry in the language of the people, and to seek the material out of which poetry was to be shaped in the common thoughts and passions and experiences of mankind.

Hardly less was the share borne in the democratisation of poetry by other great poets of that great period. Byron, himself an aristocrat by birth, believed in democracy; by his appeal to the elemental human passions he brought the im-

part of poetry on the larger world which was prepared to receive it. Shelley reared before the eyes of that larger world the glittering fabric of an imaginatively reconstructed universe in which, freed from tyranny and superstition, from selfishness and apathy, the human race might develop its noblest qualities, and life be one long ecstasy of joy. Even those who regard Byron as a beautiful fiend, and Shelley as an ineffectual angel, must admit the truth of the striking words used of them by Tennyson, that these two poets, 'however mistaken they may be, did yet give the world another heart and new pulses.'

Even more striking and significant is the attitude towards an anticipated democracy, and the part to be played in it by poetry, which was taken by Keats. He was the youngest of that great group of revolutionary poets, the most gifted and the most splendid in his wonderful promise and unfinished achievement. Beyond all those others, with a width and foresight of vision all his own, he pointed and urged poetry forward. The horizon to which he saw is still distant and unreachd. That 'joy in widest commonalty spread,' of which Wordsworth had profound glimpses, and which Shelley saw, as it were, through an iridescent burning mist, lay before the eyes of Keats, clearly, definitely, attainably. The world to which he looked forward was one in which, as he says, 'every human being might become great, and humanity, instead of being a wide heath of furze and briars, with here and there a remote oak or pine, would become a grand democracy of forest trees.' In that image he embodies for us the ideal of democracy in the highest and amplest form. And of this democratic ideal, poetry, because coextensive with human life, will be the informing spirit.

Democracy, we are often told, is on its trial. The brilliant promises of its youth have not been realised. It has

not transformed human nature. It has not done away with the vices of older civilisations, and it has developed new faults of its own. It is, among many of those who do not expressly reject it, accepted wearily as a necessity rather than embraced eagerly as a faith. Citizenship has with them become a burden, not an inspiration. Freedom and equality have sunk into mere formulary names, giving neither light nor heat, having little to do with the actual conduct and motives of life. Material progress goes on mechanically; the higher progress, the fuller self-realisation of mankind, is doubted or denied. Once more, as Wordsworth complained a century ago, false gods have been enthroned in the temple of the human spirit.

*The wealthiest man among us is the best;
No grandeur now in nature or in book
Delights us: rapine, avarice, expense,—
This is idolatry, and these we adore:
Plain living and high thinking are no more.*

So Wordsworth wrote then; and we must remember, if we are inclined to be despondent over the present case of democracy, that our dissatisfaction is no new thing, and that the mere fact of our being dissatisfied shews that we have not lost sight of higher ideals, and have the impulse in us, if we can direct and sustain it, to resume our progress towards them.

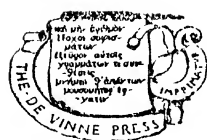
Poetry is also on its trial. The patterns of life it offers to us, the interpretation of life with which it presents us, seem to many unreal and remote. It speaks a strange language, thin and ghostly to the ears that are not attuned to it; it often holds itself aloof from, or mingles but passingly with,

the main current and texture of occupations and endeavours, of private pursuits or public interests.

Each alike suffers from the divorce that is between them. A democracy which excludes or ignores poetry cuts itself off from one of the main sources of vital strength and national greatness. A poetry which is out of sympathy with democracy is thereby out of touch with actual life. But the future that lies before both is splendid, if both will work in harmony, if national life is inspired and sustained by poetry, and poetry takes nothing less than that life for its province, gives it a heightened meaning, brings out from it the latent patterns of beauty after which it blindly but unceasingly aspires. Poetry, as Dryden said of it, is articulate music: the music to which life moves, and in which it finds its discords resolved.

Such is the task and function of the poets. But the study of poetry is not for poets alone, any more than the study of colour and form is confined to painters, or the study of music to composers. The appeal of art is universal. The inheritance of the present age is not merely the present, but the whole past as well. Of that inheritance, the great poetry of the world, from Homer downwards, is the most precious portion. It preserves for us, still alive and still having power to move and kindle, the best of what mankind has thought and felt, the most perfect forms into which it has cast its vision and reflection, its emotion and aspiration. And thus the study of poetry is part of democratic education; and the poetry of democracy, kindled by that study and appealing to a nation educated in it, will be the articulate music of national life.

JOHN WILLIAM MACKAIL.



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· THE INTRODUCTION OF WESTERN LEARNING INTO JAPAN¹

THE FIRST PERIOD

THE intercourse of Japan with the West began, in the middle of the sixteenth century, with the coming of the Portuguese ships to the coast of Kyûshû (1543). Not long after came the English, the Dutch, and the Spanish. The Portuguese and Spaniards were indiscriminately called *Nanban*, which means "southern foreigners," as their possessions in Asia lay to the south of Japan, just as in the present day we speak of all white people as *Seiyôjin*, "men of the western seas."

At this period the shogunate of the Ashikaga family was tottering toward its fall. The *Shôgun*, or *Sei-I-Tai-Shô-Gun* (which was the full title, meaning "Generalissimo for the Subjugation of Barbarians"), was the head of the military class and *de facto* ruler of the country; for the Emperor and the civil lords who formed his court had very little or no real power, although they were revered by the people and outwardly treated with honor and deference by the shôgun and his followers. The office of shôgun had at the time of the first coming of the Portuguese been hereditary in the Ashikaga family for over two hundred years, but in the feeble hands of its latest representatives its authority had gradually been weakened until the great military chiefs throughout the country paid but little attention to their orders and were continually fighting against one another in

¹ A lecture presented at the inauguration of the Rice Institute, by the Right Honorable Baron Dairoku Kikuchi, *Rigakuhakushi*, M.A., LL.D., Privy Councillor, President of the Imperial Academy, Honorary Professor of the Imperial University of Tokyo.

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a struggle for self-aggrandisement. Among them appeared three great men: the first was Nobunaga (of the Ota family), who deposed the last of the Ashikaga shôguns (1573) and brought the whole of central Japan under his authority. After Nobunaga was killed by one of his own generals (1582), Hideyoshi, another of his generals, better known by his subsequent title of Taikô, extended his power over the whole country. After the death of the Taikô in 1598, Iyeyasu, the head of the Tokugawa family, who had been gradually strengthening himself, patiently biding his time under Nobunaga and Hideyoshi, became shôgun in 1603 and established his government in Yedo. Iyeyasu and his descendants held the shogunate for fifteen generations, and were the real rulers of the land for over two centuries and a half, during which period Japan enjoyed a most profound peace, and learning and the arts flourished under the patronage of shôguns and *daimyô*s (or feudal lords).

The above brief outline is necessary for a clear understanding of the environment in which the first introduction of Western learning took place. The Portuguese were welcomed by the military chiefs principally for the sake of firearms, which were first introduced by them, and which of course gave to those possessed of them an immense advantage over their enemies. Their use and making were eagerly acquired, and already in 1553 the shôgun Yoshiteru had guns made for him at Anato, in the province of Omi, not far from Kyoto. The introduction of firearms necessarily brought about a change in tactics and fortification, but it is uncertain how much the military chiefs learned in these things from the Portuguese.

Not very long after the first coming of the Portuguese, the Jesuit missionaries arrived. They also were well received by the military lords of Kyûshû, several of the most

powerful of whom became converts; so that Christianity at first made rapid progress, spreading not only in Kyûshû and adjoining provinces, but also in the neighborhood of Kyoto, and later even in northwestern Japan. The shôgun Yoshiteru, mentioned above, is himself said to have been among the converts. Nobunaga also was at first favorable and built for them a church in Kyoto called the *Nanbanji*, or "Temple of the Southern Foreigners"; but he afterward repented of this, and his successor Hideyoshi issued orders for the suppression of Christianity. It may be mentioned that the motives which influenced both Nobunaga and Hideyoshi were entirely political and not at all religious.

Iyeyasu, his successor in power, was friendly to foreigners, and among others treated a Dutchman named Jan Joost and an English pilot, Will Adams, who arrived in a Dutch ship in 1600, with great consideration; he was eager to learn from them about the world outside of Japan. He and his successors, however, looked with no favorable eyes upon missionaries or their converts, for they were a source of trouble everywhere on account of their intolerance and quarrelsome attitude toward those of other faiths. They were, moreover, suspected of political intrigue against the shogunate and against the country; so orders were issued expelling not only the missionaries but all Portuguese and Spaniards, and forbidding people to profess Christianity on pain of death or exile. This state of affairs culminated in the breaking out in 1637 of rebellion in Shimabara, near Nagasaki, whither had flocked not only Christians driven by persecution from other parts of the country, but also a large number of malcontent and turbulent spirits, followers of lords who had fought unsuccessfully against the Tokugawas. The rebellion was put down early in the next year, and most stringent measures were taken to stamp out Christianity al-

58 Introduction of Western Learning into Japan together. Already in 1630 an order had been issued by which all foreign books, without exception, were interdicted; for although it was primarily aimed at religious books, it was impossible to make such a distinction without a knowledge of European languages. In 1635 another order was issued prohibiting all traveling abroad under the penalty of death. Thus, about ninety years after the first arrival of the Portuguese ships, all foreign intercourse was forbidden except such as was permitted with the Dutch and the Chinese under severe restrictions.¹

It is hard to say exactly how much learning had been transmitted by the Portuguese and Spaniards during this period. Among the missionaries were some skilled in medicine and surgery, and their method of treating wounds seems to have been especially appreciated; thus an elementary knowledge of "Nanban" surgery, as it was called, as well as of the warlike art of gunnery, seems to have been acquired by the Japanese from them. A man named Hayashi, who was put to death (1646) for professing Christianity, had acquired some knowledge of Western mathematics and astronomy, which he transmitted to his pupil Kobayashi; he had translated and published a work on astronomy (1635), which stands second in the list of the translations of Western books into Japanese, the first being Æsop's "Fables," translated and published early in the seventeenth century, although perhaps neither of these was a translation in the strict sense of the term, but rather a compilation. It is also interesting to note that some of the great military lords used seals bearing their names in Latin letters. There are several Japanese words of Portuguese and Spanish origin, which bear testimony to the introduction in those days of

¹ The English had previously abandoned the field, and their request to resume intercourse in 1673 was not entertained.

various manufactures; such, for example, as *biidoro* (glass, Portuguese *vidro*), *botan* (button, P. *botao*), *birôdo* (velvet, P. *veludo*), *kappa* (rain-cloak, Spanish *capa*), *meriyasu* (knit-work, S. *medias*), etc. On the whole, the amount of Western knowledge introduced during this period cannot have been very great.

THE SECOND PERIOD

OUR intercourse with the western world after the exclusion of the Portuguese and Spaniards was through the Dutch, who were permitted to come to trade in the single port of Nagasaki; even here they were confined to a small quarter of the town known as Dejima, and the trade was subjected to rigorous restrictions and placed under the strict surveillance of officials of the shogunate. A corps of interpreters was maintained in Nagasaki, the office being hereditary in certain families, as was the case in those days with almost all professions; but even they were not permitted to read or possess any foreign books, so that their knowledge of the Dutch language was entirely oral; it was not till 1745 that this prohibition was removed. Once a year (afterward once every four years) the Dutch "capitan," or chief factor, was required to come to Yedo to pay his respects to the shôgun; and these visits played an important part in the introduction of Western knowledge into Japan, for scholars in Yedo took advantage of these occasions to "interview," usually with official sanction, the "capitan" and those who accompanied him, asking all sorts of questions on all sorts of subjects. It is pathetic in some cases to read of distinguished scholars, in their simplicity and zeal for knowledge, reverently asking questions such as the factors could scarcely have understood; yet as in those days communication between Nagasaki and

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Yedo was not easy, and as the "capitans" were accompanied by physicians (rarely by such men as Kaempfer, Thünberg, and Von Siebold, who took advantage of their visits to see the interior of Japan), those interviews were really a great opportunity for those who were eager to learn about the West.

Although the first three shôguns of the Tokugawa family took such strong measures to suppress Christianity, even going so far as to cut off almost all foreign intercourse and to interdict all foreign books, yet both they and their successors were patrons of learning and the arts, and were by no means averse to the introduction of useful knowledge from the West. Several of the interpreters and others who had picked up some medical, or rather surgical, knowledge from the Dutch physicians in Nagasaki were appointed physicians to the shôgun, an example which was followed by the daimyôs. Arai Hakuseki¹ (1657-1725), a great Chinese scholar and a trusted adviser of the shôgun Iyenobu, sixth shôgun of the Tokugawa family (1709-1711), interviewed at the command of the shôgun a Franciscan priest who had arrived in 1709 at Osumi in Kyûshû and had been summoned to Yedo, where he was kept in confinement. This priest seems to have been a man of some attainments, and an account of the interviews and their results, supplemented by subsequent interviews with Dutch "capitans," was embodied in two books entitled *Sairan Igen* (1713) and *Seiyô Kibun* (1715). These books, written by a man of Arai's standing and scholarship, gave certain importance and prestige to their contents—i.e., to matters Western—which they had not hitherto possessed, and thus opened the way for the introduction of Western learning. For this reason Arai Hakuseki is regarded as its pioneer.

¹ All the names of men are given in the usual Japanese way—i.e., with the family name first.

The accession of the eighth shōgun, Yoshimune (1716–1745), gave a great impetus to the introduction of Western learning. He was specially interested in astronomy, and had a celestial globe and a sun-dial made for himself; he also sent to Nagasaki (1719) for Nishigawa Joken, who had obtained some knowledge of astronomy from Kobayashi (see above), and finally established an astronomical observatory in Yedo in 1744. Up to this time, foreign books being prohibited, the little Western knowledge that had been acquired had been either through oral communications or through Chinese translations, which had filtered through to Japan, Chinese books not coming within the category of prohibited books, for Chinese was the language of scholars in Japan to within very recent times, just as Latin was the language of the learned in Europe of the Middle Ages. But now Yoshimune removed this interdiction on foreign books, excepting those on religion (1720). In 1738 a book on astronomy presented to the shōgun by the Dutch challenged his admiration by the excellence of its illustrations, and seeking for some one to read the explanations of the plates, he ordered a man named Aoki Bunzō (1698–1769) to begin the study of the Dutch language. Aoki learned some Dutch words from the interpreters who came to Yedo with the factor, but not making much headway he went to Nagasaki, where incidentally he was instrumental in getting an order from the government allowing interpreters to read books. He returned to Yedo, having succeeded in learning only some five hundred words, which is very good evidence of the extreme difficulty of the task in those days. I regret that the space at my command does not allow me to enter into an explanation of the various obstacles that lay in the way of such study.

The death of Yoshimune in 1751—he had retired from

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active life in 1745—was a blow to the advancement of Western learning; but the impetus given could not be checked. Thus the Observatory, although abolished in 1757, was re-established in 1765. Objects brought by the Dutch began to be sought for as curios and articles of virtu, books among the rest. About this time there also flourished an eccentric and versatile genius called Hiraga Gennai; among other evidences of his originality, he in 1770 constructed an electric machine like one which he had seen in Nagasaki.

THE THIRD PERIOD

BUT now comes an event of the first importance in the introduction of Western knowledge, namely, the translation and publication of the first work on anatomy in 1774, through the joint efforts of Maeno, Sugita, and others. Up to this time the only attempt made to read Dutch books had been made by Aoki, who, as already mentioned, succeeded with enormous difficulty in learning several hundred words; some knowledge of astronomy had been acquired through Chinese translations, and the Dutch medicine, so called, had been represented by an empirical practice of surgery.

Maeno Ryôtaku (1723–1803), a physician to the Lord of Nakatsu, was a man of great originality and perseverance, and Sugita Genpaku (1733–1817), a surgeon of the so-called Dutch school, was a man of kindred spirit. Indeed, most of those who were pioneers in the introduction of Western knowledge into Japan were men of original ideas and advanced views, eager and indefatigable in their pursuit of knowledge, often at the risk of personal inconvenience or danger. Maeno, impelled by a desire to read Dutch, but unable to get much assistance from the interpreters who came with the Dutch to Yedo, became a pupil of

Aoki, who taught him all he knew. Both he and Sugita derived much profit from a Dutch physician who came one year to Yedo. Not content with this, Maeno went to Nagasaki for several months in 1770, and returned with his vocabulary extended to some seven hundred words, and with a Dutch dictionary and a book on anatomy ("Tafel Anatomia"). The next year he and Sugita were present at the dissection of an executed criminal in Senju, a suburb of Yedo, where the executions generally took place. Such dissections began about this time to be occasionally made on the bodies of executed criminals, at the request of influential physicians, the knife being usually wielded by the executioner, a member of the low *Eta* caste (the only caste that existed in old Japan, and now entirely done away with), who pointed out to those present such organs as he happened to know. The fact that such dissections took place is an evidence of the universal spirit of intellectual unrest which distinguished this age, and of which indeed the desire for Western knowledge was one of the manifestations. Up to this time, however, doctors had not dared to question, openly at least, the truth of the old Chinese teaching about the constitution of the human body, but had been enveloped in doubt and perplexity. On that memorable day Maeno, Sugita, and a few others, comparing what they saw with the figures in the "Tafel Anatomia" that Maeno had brought from Nagasaki, and of which Sugita by a most happy coincidence had also secured a copy, were greatly impressed by their faithfulness to nature, and then and there they determined to devote their lives to exploring the new domain of knowledge thus opened to their view. The very next day they met at Maeno's house and began the work of deciphering the book—for it was deciphering, and nothing less. To this task Maeno brought his knowledge of some seven hundred words

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and the dictionary, while some of them did not even know the alphabet; but, nothing daunted, they set to work and toiled for three whole years, until 1774, during which time the band was joined by some new members and deserted by some old ones. The names of the eight who were constant in their devotion to the self-appointed task deserve to be mentioned here, viz., Maeno Ryôtaku, Sugita Genpaku, Katsuragawa Hoshû (1751-1809), Nakagawa Junnan, Ishikawa Genjô, Toriyama Shôen, Mine Shuntai, and Kiriyaama Seitetsu. Sugita always wrote out at night what had been deciphered during the day, making corrections and revisions as the work progressed, so that at the end of three years the translation was completed simultaneously with the deciphering. The publication of this work, entitled *Kaitai Shinsho*, or "New Anatomy," marks an epoch in the history of the introduction of Occidental civilization into Japan; for not only was it a great training and education to those who took part in it, giving them confidence and power, and making them, as it were, the center of the new movement, but it made known to a much wider circle than before the existence of an entirely new system of learning and roused a spirit of inquiry in bolder minds, many of whom joined the pioneers as associates and pupils and became their successors in carrying on the work.

Maeno was interested in the Dutch language, and wrote several books in order to make its study and translation easier, while Sugita devoted himself more especially to the advancement of the knowledge and practice of the new medicine. From this time on, the introduction of Western knowledge was placed on a firmer basis; for original books became accessible to those who took pains enough—great pains, no doubt, but not to be compared with those of Maeno and his fellows. To this result Otsuki Gentaku (1757-

1827), a pupil of Maeno and of Sugita, contributed very greatly, both by his personal teaching and by his books, among which may be specially mentioned one entitled *Rangaku Kaieti*, or "Introduction to the Study of Dutch" (1788). Many now came to him to get help in reading Dutch; one of his pupils, Inamura Sanpaku, compiled a Dutch-Japanese dictionary containing eighty thousand words, after a Dutch-French dictionary of François Halma, and type-printed thirty copies of it by subscription in 1796. An abridged edition containing thirty thousand words was afterward made by his pupil Fujibayashi, of which one hundred copies were printed in 1810. Another dictionary based on the same Dutch-French dictionary was compiled at Nagasaki by a Dutchman, Hendrik Doeff, a resident in Nagasaki for seventeen years, with the assistance of Yoshiwo Gonno-suke and other interpreters. This was completed in 1816, but was not printed until much later (1855-1858). It was afterward known as "Doeff Halma" to distinguish it from the "Yedo Halma" of Inamura. Various abridged dictionaries were compiled, and some of them printed, all tending to make the acquiring of the Dutch language easier; but those of Inamura and Doeff continued to be standard works, and as they were both out of print, they used to be copied by poor students, who thereby earned money and at the same time increased their knowledge of the Dutch vocabulary.

The so-called Dutch medicine had up to this period been confined, as already mentioned, to the practice of surgery, but Udagawa Genzui (1755-1797), a physician to the Lord of Tsuyama, seeing the errors of the old Chinese school of medicine, became a pupil and afterward an eminent member of the band of Dutch scholars, and at the suggestion of Katsuragawa (one of Maeno's co-workers) took up the study of a Dutch work on medicine by one Johannes Gorter. Al-

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though he had the invaluable assistance not only of Katsuragawa, but also of Maeno, Sugita, Otsuki, and others, who all earnestly desired his success for the sake of the advancement of their cause, he had to contend not only with the difficulty of the subject-matter itself, but also with that of the language, as yet scarcely mastered. It took him nine years to complete the translation of the work, which was published in the tenth year (1793) under the name of *Naika Sen-yô*, or "Elements of Internal Medicine." This was the first time that the Western system of (internal) medicine was made known to the Japanese. Udagawa afterward wrote several other books on medicine. His adopted son, Udagawa Genshin (1769-1834), a pupil of Otsuki, was a very good Chinese scholar, and is said to have been a great help to Inamura in compiling his dictionary. He afterward revised and enlarged his father's work on medicine, and also published in 1806 a book called *I Han Teikô*, or "Manual of Medicine," which was of great service in diffusing Western medical knowledge. His mastery of Chinese made him a ready writer and translator—although, indeed, this might be said of almost all of those early pioneers of the new school.

Yoshida Chôshuku (1779-1824), a pupil of Katsuragawa, being led to the study of original Dutch books by reading Udagawa's *Naika Sen-yô*, was the first to begin the open practice of Dutch medicine. This gave great offense to the doctors of the old or Chinese school, who insisted that the Dutch system should be confined to surgery, as heretofore, and denounced the new medicine as outlandish and vicious; so that Katsuragawa was obliged to scratch Yoshida's name off the list of his pupils. Yoshida, however, was very successful, and afterward, on the recommendation of Udagawa, became a physician to the Lord of Kaga. He

published in 1814 a book on the treatment of fever, entitled *Taisei Netsubyô Ron*, with a later supplement, and also a work on Dutch *materia medica*. He had many pupils—among others, Takano Chôei and Koseki San-ei.

Yoshiwo Jôan was the first to call attention to the importance of the study of physics, and as an introduction wrote a book on celestial phenomena called *Kwanshô Zusetsu* (1823). Aochi Rinsô (1775–1853) was the first to publish a book on physics, *Kikai Kwanran* (1827), which was afterward amplified by Kawamoto Kômin (1810–1871) in his *Kikai Kwanran Kwôgi* (1851). Kawamoto was interested in applied science, and made various experiments; he was successful in taking daguerreotypes and photographs. Aochi's *Bankoku Yochi Shiryaku* may also be regarded as the first systematic book on geography, although unfortunately it was not printed. In 1833 was published *Shokugaku Keigen* by Udagawa Yôan (1798–1846), adopted son of Udagawa Genshin, containing an exposition of systematic botany after Linnæus; and in 1839, *Seimi Kaisô*, by the same author, which was the first book on chemistry.

We have already seen that the shôgun Yoshimune was interested in astronomy and founded an observatory. Astronomy, however, did not flourish; the knowledge of Western astronomy and mathematics, transmitted by Hayashi through Kobayashi to Nishigawa, died out with the last-named scholar. There were attempts at the translation of books on astronomy, such as that by Motoki Nidayû, a Nagasaki interpreter, who was ordered to translate a book on the use of globes, and notwithstanding his ignorance of the subject did accomplish the task (1793) after toiling at it for two years. The truth is that while in medical and allied sciences the translators were doctors who had some knowledge of the subject, or at all events were animated by

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a zeal for it, astronomy suffered from an utter lack of mathematical knowledge on the part of those who understood Dutch. It may here be stated that a system of mathematics was being developed in Japan quite independently of Western mathematics, which was not introduced till later on, and even then it was cultivated side by side with, but quite distinct from, the latter. Under these circumstances the Observatory had fallen upon evil days, and the almanac for 1795 failed to predict the total solar eclipse which took place on New Year's day (old calendar). A reform was now imperative, and Asada Gôryû (1734-1799) was summoned from Osaka to take charge of the task. He was a man of great originality; a physician by profession, he had devoted himself to astronomy and had made observations with instruments made by himself, and arrived independently at several important results, which he afterward found to agree with those of Western astronomers as stated in Chinese books (translations or compilations mostly by Catholic missionaries in China). Asada was too old to come to Yedo himself, but sent his two pupils, Takahashi Sakuzaemon (1764-1804) and Hazama Gorobei (1756-1816), in his place. They were both men of great ability, and under their direction a revised almanac was issued for 1798. Hazama then went back to Osaka. He was a man of some means, always had artisans working for him, and among other instruments made a barometer and a thermometer, with which he began meteorological observations which were kept up for some time after his death; he also devised an ellipso-graph which is described by his son. The instruments used by Inô in his survey were made under the direction of Hazama after European models. Takahashi, Asada's other pupil, was placed permanently on the staff of the Observatory. It was at his suggestion and under his superintend-

ence that the geodetic survey of Japan was undertaken by Inô Kageyu (1744-1818). Inô was well over fifty when he began the survey in 1800, and spent the rest of his life on the survey, so that the maps were almost complete at the time of his death. The wonderful accuracy of these maps, which are still preserved and parts of which have continued to be the standard map down to the present day, bears ample testimony to the skill, patience, endurance, and scientific conscientiousness of Inô. Takahashi did not live to see the completion of Inô's survey; he died in 1804, and was succeeded by his son Takahashi Sakuzemon, junior (1785-1830), also an able and enterprising man.

At the suggestion of Takahashi, junior, a bureau of translation was established in 1811 in the Observatory, Otsuki Gentaku, Baba Sajûrô (1787-1839), a Dutch interpreter of Nagasaki, and Udagawa Genshin being the earliest members of the staff, which included at one time or another most of the eminent Dutch scholars, such as Otsuki Genkan (1785-1837), son of Gentaku; Udagawa Yôan; Sugita Rikkei (1786-1845), son of Genpaku; Sugita Seikei (1817-1859), son of Rikkei; Aochi Rinsô; Koseki San-ei (1787-1839); Mitsukuri Genpo (1799-1863), grandfather of the present writer; Kawamoto Kômin; etc. This bureau of translation was the germ which has developed through several stages of transformation into the present Imperial University of Tokyo. Such a bureau was decidedly a desideratum at that time; for the Russians in the north and the English in the south were beginning to make their presence felt, sometimes in a very unpleasant manner, and the government was desirous of obtaining a fuller and more accurate knowledge of the outside world. Already Dutch scholars had written many books and pamphlets, giving information concerning the nations of the world, of which some were printed and

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published, some circulated privately in manuscripts, and some kept secret for official or individual reasons. Such were the *Bankoku Zusetsu* ("Map of the World, with Explanations," 1786) by Katsuragawa, the *Bankoku Shinwa* ("New Talk about Different Countries," 1789) by Morishima (a brother of Katsuragawa), a revision and enlargement of Arai's *Sairan Igen* by Yamamura Saisuke (a pupil of Otsuki, 1802), *Ho Ei Mondô* (a warning about the movements of the English, 1807 and 1808) by Otsuki Gentaku, etc., besides many books on Russia and the Russians by almost every one of the above writers and several others. (I mention these to show that those pioneers of the new learning were alive to the dangers of foreign attack, and were the first to warn their countrymen of it.) In 1808 several of the interpreters at Nagasaki were ordered to learn Russian and English. One of them, Motoki Shôzaemon, wrote an English grammar (1811) and compiled an English-Japanese dictionary (1814), neither of which was, however, printed. It was not till 1847 that the study of English began to be taken up seriously in Yedo. About this time Rin Shihei (1738-1793) traveled all over Japan from Yezo to Nagasaki, and became convinced of the pressing necessity of coast defense, and of the danger arising from its total neglect. He tried to impress upon his countrymen the magnitude and imminence of this danger, and with this object he wrote several books, among others *Kaikoku Heidan*, or "Talk on the Arms of an Island Country" (1787, published 1791). This book led to his being kept in confinement (1792) for trying "to excite the people to unnecessary unrest by publishing preposterous opinions based on ridiculous rumors."

The arrival of Philipp Franz von Siebold as physician to the Dutch factory was a great event in the history of the

introduction of Western knowledge; for, besides his exceptional skill in medicine, he was also well equipped scientifically for carrying on the investigations in natural history for which he had come to Japan. He resided for six years, from 1823 to 1829, in Nagasaki, where he gave clinical lectures, and many Japanese doctors and scientists visited him and greatly profited by his instruction and guidance, while he himself also derived immense advantages from their assistance. In 1826 he came to Yedo, where, among others, Takahashi of the Observatory became acquainted with him, and gave him a map of Japan in exchange for some books which Takahashi was most anxious to acquire as likely to give a very good idea of the state of Europe, but which Siebold would not give him on any other condition. Now it was against the law to give a map of Japan to a foreigner, and this act of Takahashi being afterwards discovered, he was thrown into prison, where he died soon after. At the same time an ophthalmologist, Habu Genseki, was severely punished for having given Siebold, in exchange for some ophthalmological books and instruments, a kimono with the shôgun's crest which had been given him as a reward for some special service. Many others suffered in connection with this, and Siebold himself was expelled from the country. This was a very unfortunate occurrence, for Siebold had been a great help to the students of Western learning, and his expulsion was a real blow to its cause, and this act of disloyalty, even though it had been done with good intention, brought reproach on the votaries of the new learning.

Among those who received Siebold's instruction in Nagasaki were Itô Keisuke, Itô Genboku, Totsuka Seikai (a pupil of Udagawa Genshin), Takano Chôei (a pupil of Yoshida), and others. Itô Keisuke (1803-1901) became an eminent botanist, and in 1901 was raised to the peerage at the age of

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ninety-eight for his services to the state as scientist. Itô Genboku (1800-1871) and Totsuka (1799-1876) came to Yedo and practised, taught, and wrote books on the Dutch medicine. They were very successful, Itô afterwards being appointed physician to the Lord of Hizen (1844) and later to the shôgun (1858), and Totsuka to the Lord of Satsuma (1842). Takano Chôei (1804-1850) was a man of great talent, a very good Dutch scholar, and a facile writer and translator; he also came to Yedo (1830) and began to practise and teach medicine; he translated many books, among which his *Igen Sûyô*, a work on physiology, deserves to be specially mentioned here. But his active nature and independent spirit did not allow him to lead a quiet life. With his friends, among whom the most prominent were Watanabe Noboru (1794-1842), chief adviser to a small daimyô; a Chinese scholar and artist (well known by the *nom de plume* of "Kwazan"), who, although not himself a Dutch scholar, was convinced of the importance of Western learning; and Koseki Sanei (1787-1839), already mentioned as a pupil of Yoshida,—with these and others, Takano held periodical meetings, at which they discussed all sorts of topics, literary, scientific, social, industrial, and political, in the light of Western knowledge. One day, hearing that the government had decided to send away, by force if necessary, an English ship if it should appear in Yedo Bay in accordance with the information given by the Dutch, they earnestly discussed the subject and came to the conclusion that those who understood the condition of the outside world should not be silent on such an important occasion. Accordingly, Takano wrote a brochure called *Yume Monogatari* ("A Dream"), in which he urged, in the words of a man met in a dream, the unadvisability of such a policy. This brochure

was presented to the officials of the shôgun and secretly circulated among Takano's friends. Watanabe also wrote some notes which he, however, with his natural modesty and prudence, kept to himself.

It was to be expected that the conservative element, among whom we may count the Chinese scholars in general, would look with no favorable eyes upon the instruction in what they regarded as barbarian and outlandish. One of the most persistent and implacable of them was Torii Yôzô, a narrow-minded man, who had special reasons to be unfriendly to the advocates of the new learning. He was a cadet of the Hayashi family, whose head was hereditary doyen of the Chinese literati, and on one occasion, as the head of a commission to make a survey of the coast of Izu and Sagami and to report on the best means for its defense, he had the mortification of seeing the report of Egawa Tarozaemon, his second on the commission, accepted in preference to his own. This Egawa was a friend of the new learning, and had the assistance of Uchida Yatarô and Tamura Kisaburô, pupils of Takano Chôei, who were acquainted with the modern method of surveying. The patriotic but somewhat too ardent and imprudent zeal of Takano and others gave Torii a good opportunity of taking a personal revenge and at the same time of arresting the advance of the new movement. Watanabe was ordered to be kept in confinement in the domain of his lord, where he afterwards committed *hara-kiri*, having reasons to fear that his living might be prejudicial to the interests of his lord. Takano was put into a common prison, whence he escaped at the time of a fire, and after being in hiding for some time, during which he was employed in making translations, was discovered and killed himself in order to avoid further

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humiliation. Koseki Sanei also killed himself as soon as he heard of the arrest of Watanabe and Takano, and many others suffered in various degrees.

Another victim of Torii's enmity was Takashima Shirodayû of Nagasaki, who, having learned modern gunnery from a Dutchman, had been summoned in 1841 to Yedo to exhibit his method and skill. Egawa Tarozaemon was the first to enroll himself as his pupil and to receive instruction in the new method. After his return to Nagasaki, Takashima was accused of secret intercourse with the Dutch and thrown into prison, whence, however, he was released in 1853 to give instruction in gunnery.

The way of Dutch scholars, which had been by no means smooth before these events, was now made still rougher by various restrictions, which, however, could not stop the steady progress of Western knowledge. Among the pupils of Udagawa Genshin were Tsuboi Shindô (1795-1848), Mitsukuri Genpo (already mentioned), and Totsuka Seikai. Tsuboi began to systematize the teaching of the Dutch by prescribing a course in which the reading of grammar had an early and important place. One of his pupils, Ogata Kôan (1810-1863), began to practise the Dutch medicine and to teach the Dutch language and medicine in Osaka in 1838. Ogata's school, which was in existence till 1862, and of which a most interesting and vivid account is given in the autobiography of his pupil, Fukuzawa Yukichi, the founder of the *Keiô Gijuku*, became the center of Western learning in western Japan, and counted over three thousand pupils, among whom were many leaders of new Japan, too numerous to mention. Another pupil of Tsuboi, Sugita Seikei, in Yedo also had many distinguished pupils, among whom may be mentioned Kanda Kôhei, who first taught Western mathematics in the *Kaiseijo*,¹ and Sugi Kôji, the father of

¹ See page 78.

statistics in Japan. Books on law and politics were now ordered to be translated in the Translation Bureau, though solely for official use. Mitsukuri Genpo wrote the *Taisei Shinjû*, the first systematic history of Europe; while his pupil and adopted son, Mitsukuri Seigo, published his *Konyo Zushiki* (1847), which gave the general public for the first time a tolerably up-to-date knowledge of the geography of the world. Mitsukuri also printed a Dutch grammar in script characters by means of wood blocks (the usual way in those days), which was a great help to the students of Dutch, for before this they had to copy the book for themselves before beginning to read it. This continued to be the case with most foreign books until well on in the sixties, for imported books were scarce and they could not be printed in Japan; the present writer did not have to do this copying, but he can remember his brother, elder by a few years, copying (somewhere about 1866) Markham's "History of England," which he was learning to read. Fujii Saburô was the first to attempt the reading of English books, and his *Ei Bun Pan* was the first book published on the subject (1847). About this time, also, Murakami Eishun (1811-1883) for the first time began to read French books with the help of a French-Dutch dictionary.

By the middle of the nineteenth century doctors practising Dutch medicine had become so many and so successful, especially in Yedo, as to cause serious uneasiness to doctors of the old Chinese school; and through the influence of the latter an injunction was issued in 1849, confining the practice of the Dutch school to surgery only, so that Itô Genboku and others had to enroll themselves pupils of Katsuragawa, the shôgun's surgeon, before they could practise publicly. Moreover, it was made necessary to obtain the permission of the authorities of the old Medical Academy before pub-

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lishing any book on the new medicine: this of course was tantamount to a prohibition. It was not much better with books other than medical: permission to publish any work relating to Western learning was always granted very grudgingly; thus, for instance, my grandfather, although he was on the staff of the Translation Bureau, had to wait for two years (from 1849 to 1851) after the wood blocks had been completed before he could get permission to publish his *Hakkô Tsûshi*, a book on geography. But even such measures were not sufficient to stop the introduction of Western learning, and the coming of the American, Russian, and English ships demanding the opening of Japan to trade, and the subsequent change of policy on the part of the shôgun's government, made the knowledge of foreign languages and foreign matters in general imperative.

In looking back over this period, the first thing that strikes us is the fact that the first introduction of Western knowledge was almost entirely due to doctors of medicine, who, however, as we have seen above, did not confine themselves to medicine alone. This was due to various circumstances. As I have remarked before, about the middle of the eighteenth century there arose in Japan a remarkable revolutionary movement in things intellectual, a general restlessness and reaction against old authorities, a search for new knowledge; and the doctors were almost the only persons possessing sufficient culture who were likely to turn their attention to foreign learning. Moreover, the superiority of the Dutch method in surgery had long been acknowledged, and their superiority in other branches of medicine could also be demonstrated by facts and appreciated by the public; and thus this was the door through which Western learning could enter with the least resistance.

I have perhaps not stated explicitly enough the difficulties

and dangers confronting those who were bold enough to break through the hard crust of custom and prejudice and to attempt to learn a strange language and so to open an avenue to a new and alien learning; to do so would require too long a digression into the organization of the society and the character of the civil administration of the time; suffice it to say that they were very great, indeed, and sometimes insuperable.¹

Special mention should, however, be made of the assistance that many of the *daimyô*s, actuated some by true and intelligent perception of the importance of the new movement, others by mere curiosity or vanity, rendered to its pioneers by their patronage and by giving them leisure to pursue their study, as well as by supplying them with books and other materials.

THE FOURTH PERIOD

INTERESTING as it would be, this is not the place to describe the stirring events which followed the coming of Commodore Perry in 1853 and the opening of the country again to foreign intercourse, and led to the "Restoration of Meiji" in

¹ I cannot refrain from mentioning one example of these difficulties. Even toward the end of this period, when it had become comparatively easy to get Dutch books, it was only through the *shôgun*'s officials, and with their permission, that a private individual could obtain a foreign book, and then not more than one a year. Often interpreters who accompanied the Dutch chief factor from Nagasaki on his visit to Yedo brought some books with them which they sold secretly to the Dutch scholars at a great profit. In one of my grandfather's (Mitsukuri Genpo) letters to my father (Mitsukuri Shûhei), he complains that the Dutch, having met with a theft on the way, were so strictly guarded that it was impossible to get an interview with them as usual, and that the interpreters were afraid of selling the books that they had brought, or else demanded such prices for them that a poor scholar like himself could not afford to buy. Yet this very difficulty was often an incentive to a new line of study; as an instance, I may mention the case of Murakami, who, failing to get the Dutch book on chemistry that he wanted, but being supplied with a French book in its place, set to work to learn to read French instead of waiting for the Dutch book, which would be at least eighteen months in coming.

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1868; we must confine ourselves to those relating more particularly to the subject in hand.

In 1855 the Translation Bureau was made independent of the Observatory, and under the name of *Bansho Shirabejo* ("An Institution for the Study of Foreign Books"), which was finally changed to *Kaiseijo*, besides translation, instruction was given in foreign languages, not only to the shōgun's immediate retainers but also to those of daimyōs, Mitsukuri Genpo and Sugita Seikei being among the earliest professors. The foreign languages taught were Dutch, English, Russian, French, and German. A department of natural products (or natural history) was added in 1861, with Itō Keisuke as professor; a department of mathematics (although naturally of an elementary character) in 1863, with Kanda Kōhei as professor; and a department of physics and chemistry in 1865, under a Dutch professor named Gratama. In 1867 the modern method of class teaching was introduced.

In 1863 a foreign language school was opened in Nagasaki by the shogunate, at which Chinese, Dutch, English, French, and Russian were taught. Thus the instruction in foreign languages hitherto given only by private persons was now given at those schools or academies by professors appointed by the government of the shōgun. Some of the greater daimyōs followed the example and established schools for the teaching of one or more foreign languages, usually English, which now came to be studied more than any other language—more even than Dutch. At the same time private tuition went on as before, and some regular private schools were established, of which that of Ogata, already mentioned, and that of Fukuzawa, afterward called "the *Keio Gijuku*," were the most notable examples.

The march of events was such that the injunction against

the practice of Dutch medicine lost its effect. In 1857 Itô Genboku, Totsuka Seikai, and others opened a "vaccination institute," where doctors of the new school held meetings, there being more than eighty of them in Yedo at the time. Next year Itô and Totsuka were called in to attend upon the shôgun in his illness. The Vaccination Institute was made a government institution, with three departments for instruction, for discussion, and for vaccination. In 1861 the name was changed to *Seiyô Igakujo* ("The Academy of Western Medicine"). In 1860 Matsumoto Ryôjun opened a hospital in Nagasaki, where he had been studying under a Dutch naval medical officer named Pompe. The next year this hospital was turned into a government school of medicine, with a Dutch doctor named Bowdoin as professor; this doctor was the first foreign professor employed by the Japanese government. In 1865 physics and chemistry were added to the subjects taught in this institution.

Missionaries now began to come to the open ports and gave lessons in languages; some were engaged by daimyôs to teach in the interior. Among the missionaries the names of the Americans Hepburn, Brown, and Verbeck must specially be mentioned, all men of sterling character and attainments. Dr. Hepburn practised medicine in Yokohama; his Japanese-English dictionary, the first of its kind, is still in use, and the system of transliteration of Japanese characters into the Latin alphabet employed in it has remained the standard down to the present day.

Books, translations, and original works on various topics now become too numerous to enumerate; I shall mention only two besides Hepburn's dictionary: one is the English-Japanese dictionary compiled by Hori Tatsunosuke, assisted by teachers in the *Kaiseijo*, and the other the work entitled *Seiyô Jijô*, or "Things Western," of Fukuzawa Yukichi, in

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which he describes what he had observed of the western world during his travels in America and Europe, whither he went as a translator to the embassies sent by the shogunate to America in 1860 and to Europe in 1861. This book did more to make the West known to the general public than almost any other book; indeed, it was unique at the time both in the nature of its contents and in the number of copies sold.

In 1862 the shôgun's government sent a number of students to Holland, among whom were Enomoto (afterward Viscount, Minister of the Navy, of Education, etc.) and Akamatsu (Admiral, Baron), to learn navigation; Itô Genpaku and Hayashi Kenkai to study medicine; Nishi Amane and Tsuda Mamichi, who studied law (both afterward barons). The next year four students were sent to Russia. In 1866 a party of fourteen students was sent to England, among whom were Nakamura Masanao, already known as a Chinese scholar, and afterward a great educationalist; Toyama Masakazu (afterward professor and president of Tokyo University, and Minister of Education); Hayashi Tadasu (Count, the present Minister of Communications); and the present writer, the youngest of the party (being eleven years old at the time), with his elder brother, Mitsukuri Keigo. Finally, in 1867, the shôgun's brother, Tokugawa Minbutayû, was sent to France with another party of students: in his suite were such men as Shibusawa Eiichi (now Baron) and Mitsukuri Rinshô (afterward Baron, grandson of Genpo). A few of these students came home before the Restoration, but all were recalled in 1868. Most of them afterward did good service in the introduction of Western learning into Japan. The Satsuma clan also sent a number of students abroad, and a few went on their own initiative, among whom were the late Prince Itô and Mar-

quis Inouye: these had to go secretly, as the order forbidding all traveling abroad was still in force.

Although the shôgun's government saw the necessity of opening the country to foreign intercourse, the conservatives all over the country were bitterly opposed to such a step. This opposition to the foreign policy of the shogunate, inseparably combined with the more fundamental one based on our national constitution, namely, that the shôguns were usurpers and were wielding authority which properly belonged to the Emperor alone, was the force that ultimately brought about the downfall of the shogunate and the "Restoration of Meiji." Conservative feeling ran very high, and masters of the new learning were now often in danger of their lives from conservative samurais, who regarded their action as a desecration of the land of the *Kami* (ancient gods of Japan). Sakuma Shuri was assassinated in Kyoto for his open advocacy of the opening of the country. It was under the cry of "Reverence for the Sovereign!" and "Exclusion of Barbarians!" that the overthrow of the shogunate was effected.

THE FIFTH PERIOD

WE now come to the era of *Meiji*, or "The Enlightened Government," which began in 1868 and ended with the death of Emperor Meiji in July of the present year (1912). The accession of the Emperor took place in the beginning, and the resignation of Keiki, the last of the shôguns, toward the end, of the preceding year. A few disaffected followers of the shôgun took up arms against the imperial banner, but were put down without very great difficulty, and thenceforth the Emperor reigned in fact as well as in name. Although the cry for the overthrow of the shogunate had been "Reverence for the Sovereign!" and "Exclusion of Barba-

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rians!”, yet the leaders of the movement knew well that the last was neither practicable nor desirable; and on the fourteenth day of the third month of the first year of Meiji (April 6, 1868), the Emperor summoned the imperial princes and high officials of his court, and in the *Shishinden*, or throne-room, of the old palace in Kyoto swore the memorable oath known as “The Imperial Oath of Five Articles,” setting forth the policy which was to be followed by him thereafter. The five articles were as follows:¹

- I. Deliberative assemblies shall be established, and all measures of government shall be decided by public opinion.
- II. All classes, high and low, shall unite in vigorously carrying out the plan of government.
- III. Officials, civil and military, and all common people shall, as far as possible, be allowed to fulfil their just desires, so that there may not be any discontent among them.
- IV. *Uncivilized customs of former times shall be broken through*, and everything shall be based upon just and equitable principles of nature.
- V. *Knowledge shall be sought for throughout the world*, so that the welfare of the Empire may be promoted.

In pursuance of the policy set forth in the above oath, the first ten years of the Meiji era were occupied mainly in breaking up the established order of things and substituting a new one; although, as for the latter, a much longer period elapsed before anything satisfactory could be arranged. Many great and radical changes were made, of which the

¹ The translation is that of Dr. Hozumi Nobushige, Emeritus Professor of Law in the Imperial University of Tokyo.

greatest by far was the abolition of the feudal system, which was completed in 1871: the daimyô, or great military lords, gave up, of their own free will, all their lands and the power of life and death over their retainers and people within their respective territories, receiving in compensation pensions which were afterward commuted into national bonds. A new system of civil administration was introduced, and laws were revised. The wearing of swords by samurais was forbidden, the army and navy were reorganized, and a system of universal conscription elaborated, so that the samurais, or military class, no longer were allowed to monopolize the civil and military services.

Schools established by the shogunate and closed at its overthrow were reopened as soon as order was restored, and many new schools were opened both by the central and the local government (those of the daimyô before the abolition of feudal clans). Many private schools for the teaching of Western knowledge flourished, among which may be specially mentioned the *Keiô Gijuku* of Fukuzawa, the *Sansa Gakusha* of Mitsukuri Shûhei (father of the writer), and the *Dôninsha* of Nakamura Masanao. Of Fukuzawa it is related that in May, 1868, while fighting was going on in Ueno (now Ueno Park, Tokyo) between the imperial army and some retainers of the shôgun, Fukuzawa continued to hold his classes in another part of the city, and his school was not closed for a single day.

In 1872 the first Education Code was promulgated, by which a national educational system was introduced for the first time. According to this, the whole country was to be divided into 8 university districts, each with a university; each university district was to be subdivided into 32 middle school districts, each with a middle school; and each middle school district was again to be subdivided into 210 elemen-

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tary school districts, each with an elementary school, so that there would be 8 universities, 256 middle schools, and 53,760 elementary schools in the whole country: the elementary school education was to be compulsory for all classes and both sexes. At the same time as the promulgation of the new code, all existing schools supported by the government, central or local, were to be reorganized so as to be brought into conformity with its provisions or else be closed. The scheme of the code, however, proved too ambitious to be carried out in its entirety. In fact, in this, as in many other forms that followed the Restoration, we began with copying too closely the system or model of some one country, and that not always the one best suited to our circumstances, sometimes trying one model after another in our effort to find out what was the best; but gradually, as our knowledge has increased and our field of vision become widened, we have tried to adapt and make it more suitable to our own needs, by a careful consideration not only of systems and methods of different countries in theory and practice, but also of our own customs, usages, and traditions, and the peculiar circumstances of the times, which at first were often overlooked.

We cannot go afield into the whole question of the educational system, but must confine ourselves to the introduction of Western learning. Before the coming of Commodore Perry this was naturally most easily effected through the medium of the Dutch language, which, indeed, may be said to have been the only channel then available. But with the opening of the country to foreign intercourse, the English language began to be more generally studied, as it was the current language of the East. American missionaries helped to spread the knowledge of it among the Japanese people, many of them becoming teachers in schools after the Resto-

ration. The study of foreign languages in general, which had presented such great difficulties and even dangers in the earlier days, was now stripped of all extraneous difficulties and encouraged and made a part of the higher common education, so that from that time on mere study of foreign languages scarcely comes within the scope of our subject. In private schools for foreign languages, however, students were often of mature age and had had previous culture in Chinese literature; they read works on politics and economics, on Western philosophy and other abstruse subjects, as well as books on history, geography, and other common subjects, with a view to mastering the subject-matter, and consequently a knowledge of those subjects became more general. Gradually, as higher common education spread, and with it the study of English, these private schools lost in large part their *raison d'être*, and in the eighties most of them were either closed or transformed partly or wholly into middle schools for higher common education, or into colleges for the teaching of special subjects.

In the *Kaiseijo* (Academy for Foreign Languages) established by the shogunate and reopened by the new government, the same kind of tuition as in private schools was carried on by Japanese teachers for some time, side by side with the new and systematic instruction in foreign languages under Japanese and foreign teachers; but soon the former part was discontinued, and, on the other hand, provisions were made for instruction in law, some branches of science and engineering, and in history, philosophy, and literature, with a view to make it a nucleus for a university. In 1877 the *Kaiseijo* and the *Igakujo* (see pages 79, 89 and 91) were incorporated as the University of Tokyo, with four faculties of law, science, literature, and medicine, to be again reorganized in 1886 into the present Imperial University of

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Tokyo (by amalgamation with the Engineering College, formerly under the Department of Public Works), with five "colleges," or faculties, of law, medicine, engineering, literature, and science, to which was afterward (1890) added a College of Agriculture. Let us now briefly consider the development of these faculties or colleges.

Before the Meiji era scarcely any attention had been paid to Western laws and political science; the few books on these subjects that had been translated by order of the shôgun's officials had not been made public, it being the policy of the shogunate to suppress all political discussions as much as possible. With the Restoration all this was changed. The reorganization of civil administration and the revision of laws and legal procedure required a knowledge of Western facts and ideas on those subjects, and books bearing on them began to be eagerly studied in the original or in translations. Accordingly, those who had acquired some legal knowledge of the West, such as Tsuda Mamichi, Nishi Amane, Mitsukuri Rinshô, and others, were in great demand. A translation of the Code Napoléon made by the last named was an important work, and contributed greatly to the spreading of the knowledge of Western legal ideas. In 1873 a French legal expert, M. Boissonade, was engaged as adviser to the Department of Justice.

It is not the province of this paper to trace the history of the codification of Japanese laws, which occupied a period of some forty years, but it may be briefly stated that the first draft, a close copy of the French code, was considerably modified through a greater attention paid to the old and established customs and usages of the country, and by the taking into consideration of the laws of other lands, especially of Germany. In this we have another very good instance of what we have stated above in connection with the

educational system. The names of Professors Hozumi Nobushige, Tomii Masaakira, and Ume Kenjirô, of the Imperial University, Tokyo, must be mentioned even in this brief notice; for to them and to Mitsukuri Rinshô more than to any others is due the credit of the successful accomplishment of the work of codification.

A school was opened in 1872 under the Department of Justice to give instruction in French law, while in the *Kaiseijo* a course in English law was opened in 1874, as stated above. We find in the calendar of Tokyo University for 1878 three professors of English law, one Englishman, one American, and one Japanese, the American being Professor H. T. Terry (Yale, '69), who has just retired this summer (1912), and the Japanese, Inouye Ryôichi, one of the first two Japanese graduates of Harvard Law School. There were also some lecturers on old Japanese laws. In 1885 the school of French law was transferred to the university, and in 1887 a course of German law was added. As the work of legislation progressed, lectures on Japanese law were given at first as auxiliary subjects, but finally they came to be the main subjects, while lectures continue to this day to be given on English, French, and German law as auxiliary subjects. Public laws, political sciences, and economics also now form a part of the curriculum of the Law College, which at present consists of the four sections of law, politics, economics, and commerce. I cannot do better than sum up by quoting Professor Tomii's remarks: "Thus the two decades immediately subsequent to the Restoration were characterized by prevalence of the study of French, English, and American laws. . . . But times changed. The past twenty years have witnessed the rise and ascendancy of German law, and a tendency has grown up to take it as the model in studying jurisprudence and legislative work, whether in the domain

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of public or of private law. . . . Recent developments have been remarkable, and the stage of imitation has already been left behind." ("Fifty Years of New Japan," by Count Okuma.) These remarks will apply also to political and economic sciences, as indeed to almost all branches of learning introduced from the West.

Early in the eighties, owing to changes in civil administration and in laws and legal procedure, there was felt a great want of men having special knowledge of these subjects, and the single University of Tokyo not being able to turn out a sufficient number of such men, several colleges were started by private individuals, who disinterestedly gave some of their leisure hours to teaching in them; the first of these was the *Senshû Gakkô*, opened in 1880 by Tajiri Inajirô (a Yale graduate) and others to give instruction in law and economics. This was followed within a few years by many others, among which was the *Waseda Senmon Gakkô* of Count Okuma. The *Keiô Gijuku* also changed its organization so as to have college courses in law, political economy, and literature. In Tokyo University itself a special course was organized temporarily, in which instruction was given in Japanese for those who had not passed through the preparatory course, so as to enable them to follow the regular course of lectures. It may be mentioned here that in almost every subject lectures in the university were given at first in some foreign language (German in the case of medicine, English in others), not by foreign professors alone, but by Japanese professors as well; for it was very difficult to find proper translations not only of technical terms, but also for necessary technical expressions and phrases, these being even more troublesome than simple terms on account of the peculiar nature of the Japanese language. Indeed, one of the initial difficulties in the intro-

duction of Western learning may be said to have lain in the difficulty of translation, our language being so radically different in its structure from European languages. Thus the lectures in Japanese to special classes served the double purpose of turning out a large number of moderately well trained men, and of giving professors a good exercise in lecturing in Japanese on technical subjects. The opening of such special classes in the university for a time was not confined to the law faculty, but was found necessary in other faculties also. However, to return to private colleges, the maintenance of such is somewhat difficult in Japan, as no large fees can be charged owing to the poverty of most of the students, and endowments such as are so common in America cannot be expected, those even of *Waseda* and *Keiô* being quite insignificant in comparison with the endowments of even smaller colleges in America. In those earlier days of the Meiji era, when the number of students was small, most of the founders were themselves teachers who gave their time and services free, besides in many cases contributing to the expenses of maintenance. For this reason, there are but very few private colleges of medicine, science, or engineering, their establishment and maintenance being too costly to be supported by fees. I may mention incidentally that most of these private colleges have now assumed the more ambitious title of universities.

As the introduction of Western learning previous to the Meiji era had been due almost exclusively to doctors of medicine, although happily they did not confine their attention to medicine alone, it was natural that at the outset more progress should have been made in medicine than in other subjects, and it was in medicine that systematic instruction was first introduced after the Restoration. The *Igakujo* was one of the schools reopened by the new government,

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and with it was incorporated a hospital newly opened by the government under the direction of an English surgeon, Dr. Willis. The government, however, having decided to Germanize medical education, Dr. Willis left the hospital and went to Kagoshima, where until 1877 he taught in a medical school with great success. Meanwhile two German doctors, Müller and Hoffmann, were engaged in the *Igakujo* in 1871, and organized a system of medical instruction consisting of a five-year preliminary or general course and a five-year special or medical course. Almost all the professors and teachers, including teachers in German, Latin, and elementary mathematics, had to be brought from Germany. As the number of those who could enter this regular course of ten years was limited, owing to the lack of accommodation and equipment, while on the other hand the demand for doctors of the Western school was great and insistent, a short special medical course was opened, in which instruction was given in Japanese by Japanese professors. In the calendar for 1877 we find the names of eleven German professors and teachers, besides seven Japanese professors engaged in teaching the students of the short course. This course was afterward discontinued, as several colleges of medicine came to be established in different parts of the country to carry on a similar work. The College of Medicine in the university itself has gradually grown to be a large body with twenty-seven professors, all Japanese, including four in pharmacy, and nineteen assistant professors and lecturers, and nearly eight hundred students.

With regard to science and its application, we have seen that translations of books on various scientific subjects had been made by Dutch scholars, some of the more important of which we have mentioned above. But there must have been many that were not printed or even privately circulated,

for there are in possession of the writer's family translations of works on astronomy, geology, mineralogy, etc., left in manuscript by Mitsukuri Genpo, and no doubt there were similar manuscripts left by others. In Western mathematics, physics, and chemistry, teaching of the elementary parts was begun in the *Kaiseijo* before the Restoration, as already stated, but it was not revived for some time after the school was reopened. In astronomy such practical knowledge had been introduced as was necessary for the compilation of almanacs. In natural history some advance had been made in systematic botany. As for applications of science to practical purposes, but little knowledge had been introduced.

On the promulgation of the first Education Code, the *Kaiseijo* was made a middle school, the instruction being given in a foreign language (English, French, or German), mostly by foreign instructors. Soon after courses were opened in special subjects, of which the one in English law has been already noticed. The other courses were those of physics, chemistry (pure and applied), mining and metallurgy, civil and mechanical engineering, and literature and philosophy. In the calendar for 1876 we find eighteen foreign professors and instructors, including two professors of English law. The incorporation of the *Kaiseijo* and the *Igakujo* into the University of Tokyo in 1877 gave a great impetus to the study of science. Mathematics was made one of the main subjects (previously it had been merely an auxiliary subject for engineering students), and the study of its higher branches was entered upon. The appointment of Dr. Fujisawa Rikitaro in 1888 as professor of mathematics in conjunction with the present writer gave a new impetus to the study of higher mathematics. The year 1877 saw the foundation of the Tokyo Mathematical Society, which is the first of many scientific societies now existing, and which has

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since developed into the present Tokyo Mathematico-physical Society, holding monthly meetings for the reading of original papers on mathematics, astronomy, and physics, and publishing them (in Japanese, English, or German) in its proceedings and transactions.

In physics the coming of Professor Mendenhall (afterward superintendent of the United States Coast and Geodetic Survey) marks the beginning of the teaching of experimental physics and of original investigations. He was succeeded by Professor Ewing, whose work on hysteresis was begun in Japan; and their work has been ably carried on by their pupils and successors, Tanakadate Aikitu, Nagaoka Hantaro, and others. Instruction in practical astronomy was started by Professor Paul, of the United States Naval Observatory, who was succeeded by Professor Terao; and although from its nature astronomy does not possess many votaries in Japan, and although the university observatory is at present but poorly equipped, Japanese astronomers have made some contributions to the science, as, for example, in the observations of variations of latitude, for which an international observatory has been established in Mizusawa and placed under the direction of Dr. Kimura, whose discovery of the α -term in the equation of the variation of latitude has recently been awarded a prize by the Imperial Academy of Tokyo. In chemistry, pure and applied, we had Professors Atkinson (English), Wagener (German), and Jowett (now of Oberlin College), whose places were not long after taken by the Japanese professors, Sakurai Jôji and Matsui Naokichi: the former still occupies the chair of chemistry in the Imperial University, and during his long career of over twenty-five years in the university has contributed both by his teaching and original researches not simply to the introduction of that science into Japan, but to

the advance of the science itself; while the latter, too, did great service not only in the introduction of chemistry, but also of scientific agriculture in his capacity as director of the College of Agriculture from its amalgamation with the university in 1890 to his death in 1910.

In natural sciences, Dr. E. S. Morse, of Salem, Massachusetts, came in 1877 as professor of zoölogy; he established the first zoölogical laboratory in the university, and was also the first to expound to the Japanese public, by a series of public lectures, the Darwinian theory of the origin of species and the descent of man. He was succeeded by Professor Whitman, late of Chicago University, after whom the chair was occupied by Dr. Mitsukuri Kakichi (brother of the writer), supported by his colleague, Professor Iijima Isao, who had been a pupil of Whitman, and afterward of Leuckart in Leipsic. The chair of botany was occupied from the first (1877) by a Japanese, Yatabe Ryôkichi, a graduate of Cornell, with Dr. Itô Keisuke, then over seventy years of age, as honorary professor. To these men is due the credit of having introduced into Japan modern methods in biology, the elements of which now form a part of the curriculum of common education.

Geology, mining, and metallurgy also began to be taught in the *Kaiseijo*. Professor Munroe, now of Columbia University, was the first professor of geology and mineralogy; after him we had a series of professors from Germany. On the organization of Tokyo University, geology, with the allied sciences of mineralogy and paleontology, was separated from mining and metallurgy. Civil and mechanical engineering was likewise begun in the *Kaiseijo*, and afterward formed a section in the faculty of science in Tokyo University.

Systematic meteorological observations were begun at

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the suggestion of a German, Dr. Knipping, a teacher in the *Kaiseijo*, and a central meteorological observatory was established and placed under his direction. At present it is under a Japanese superintendent and staff, and is in telegraphic communication with numerous stations all over the country, including Formosa, Korea, and Manchuria. It is not strictly proper to speak of seismology as introduced from the West, for it may be said to have originated in Japan with the investigations of Professors Wagener, Milne, Gray, Ewing, Knott, Sekiya, Omori, and others; but its first investigators came from Europe, and its methods are those of the Western science.

The Department of Public Works (not now existing), being in urgent need of a large number of trained engineers to carry out its various works, opened an engineering school as early as 1871; in 1873 it invited from Great Britain a band of professors, with Dr. H. Dyer as principal, and including, among others, such men as E. Divers, J. Milne, W. E. Ayrton, J. Perry, and T. Gray. They organized an engineering college, entirely British in its character; students were dressed in a uniform, of which a Scotch cap formed a part, and were lodged and boarded in British style under a purely British management. There were sections of civil engineering, mechanical engineering, architecture, telegraphy, chemistry, and metallurgy and mining. Many of the foremost engineers of the present day are graduates of this college. In 1886 the college was incorporated with Tokyo University to form the Imperial University of Tokyo, of which, together with the engineering sections of Tokyo University, it became the College (or Faculty) of Engineering.

The first introduction of scientific agriculture must be attributed to General Capron, chief of the Agricultural Bureau of the United States, who came to Japan in 1871 as

adviser to the Hokkaido (Yezo) Colonization Bureau. At his suggestion an agricultural college was established in Sapporo with a staff of American instructors to train men to become leaders in the work of the colonization of Hokkaido; several students were also sent to America, and it is to be noted that among these students were several young girls, the first sent abroad by the government (Princess Oyama, Baroness Uriu, Miss Tsuda, among others). Hokkaido, and in particular the Agricultural College, was thus very much under American influence at the start, and retains to this day traces of that influence (the present director of the college was its former pupil and afterward a graduate of Johns Hopkins). The college, however, has lately come under German influence, which, as already remarked, has been predominant in the domain of higher learning during the last two decades or more; it now forms a part of the Northwestern Imperial University as its college of agriculture. In the meantime an agricultural school was opened in Tokyo as early as 1877, and a school of forestry in 1881; the two schools were amalgamated in 1886 to form a college, which again became a part of the Imperial University of Tokyo in 1890, and has at present five sections of agriculture, agricultural chemistry, forestry, veterinary science, and aquatic products. This college was from the first under German influence, several of its first professors having been Germans.

In literature we have always had an American or an English professor of English literature, from the days of the old *Kaiseijo* soon after the Restoration down to the present day, in the Imperial University of Tokyo, besides instructors in the English language. So also there have been a German professor of German literature and a French professor of French literature, although these chairs were not established

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until a much later date. Of course, Japanese and Chinese literatures have always formed a part of the curriculum of the university, and I should not mention them here, for they do not come under the category of Western learning, but for the remarkable fact—which well illustrates the spirit that actuated the university authorities of those days—that about 1887 an Englishman, Professor B. H. Chamberlain, was for a time appointed to lecture on philology and *Japanese* literature. Professor Chamberlain was, indeed, a profound Japanese scholar, but there were many Japanese who were better scholars than he; they, however, did not know the modern methods and could not give such systematic exposition as Professor Chamberlain. Lectures are also now being given in Russian literature. In the Imperial University of Kyoto lectures on English and German literatures are given by Japanese professors, as also in the private universities of *Waseda* and *Keiô*. There is a great deal of interest taken in recent works of modern European novelists and dramatists, especially of Russian and Scandinavian writers, among a section of young Japan, which no doubt will have some influence on the future intellectual life of Japan, but it seems rather doubtful whether they will seriously affect the mass of the people.

The culture of the pre-Meiji era had been founded on Chinese classics and Buddhist philosophy, and in the earlier days of the introduction of Western learning little or nothing was known of Western philosophy; but shortly before the Restoration, books on the subject began to be introduced, and for some time thereafter such works as the text-books on ethics and political economy by Dr. F. Wayland, of Brown University, were read in schools of the English language; in higher classes, Guizot and Buckle were read, while in French schools Montesquieu and Rousseau were used. In

the *Kaiseijo* logic and psychology were taught with Mill, Fowler (deductive logic), Haven's "Mental Philosophy," etc., as text-books. On Professor Toyama's (see page 80) return from America in 1876, where he had graduated at Ann Arbor, works of Bain, Jevons, and Spencer were introduced, and Professor Toyama began to lecture on Spencerian philosophy, which became very popular in Japan. Professor Fenollosa, who afterward did so much to make Japanese art known to the Western public, came out to Japan when as professor of philosophy, and introduced students to German and especially to Hegelian philosophy. About 1890 Dr. Inouye Tetsujirô came back from Germany, and by his wide reading and retentive memory has been of eminent service in introducing students to various phases of Occidental and Oriental philosophy. Lotze, Nietzsche, Schopenhauer, etc., have not been without their exponents in Japan. Experimental psychology was introduced by Professor Motora Yûjiro (a graduate of Johns Hopkins) in Tokyo and by Professor Matsumoto Matataro (a graduate of Yale) in Kyoto. Christian theology has not occupied a prominent position either in Tokyo or Kyoto Imperial Universities, although touched upon by Dr. Anesaki in Tokyo and Dr. Gulick (of Dôshisha) in their lectures on the science of religion. There are, however, several Christian colleges supported by missions or by endowments, where it is the principal subject of instruction. The Dôshisha in Kyoto, founded by Dr. Neeshima and maintained largely by endowments from America, must be specially mentioned in this connection; it has this year (1912) made a new departure in opening a college of law and economics.

Before closing this hasty and rough account of the introduction of various branches of Western learning, it is proper that I should say a few words about foreign professors.

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They generally come out to Japan on a contract to serve for a term, usually of three years, which is renewed from time to time if satisfactory to both parties. Thus no small number of them have occupied their positions for fifteen, twenty, or even more than twenty-five years, so as to celebrate their silver jubilees, and have retired with a decoration from the Emperor, a pension from the government, and the title of honorary professor from the university. Very often we have had to part with a good professor because he had been offered a better and permanent position at home. On the whole, we have been fortunate in our foreign professors, the majority of them having been men of high character; and not only have they been good teachers, but many of them have made original researches while in Japan, which have won them distinction in their respective specialties. At the same time, we have sent our best graduates abroad to prosecute further studies under eminent professors in foreign universities. In earlier days more students were sent to America and England than to any other country; but for the last two decades or more most of the students from the universities have gone to Germany, that country offering the greatest facilities for the prosecution of higher postgraduate studies. They have on their return taken positions vacated by foreign professors going home or created by the development of education and learning.

We have thus traced the history of the introduction of Western learning from its beginning down to the present day. We Japanese have always been ready to take from others what we have considered to be good for us. When we came in contact with the Chinese civilization and Buddhism in ancient times, we at once introduced them and adopted Chinese literature and Chinese and Buddhist philosophy as our own, and they have formed the main subjects of culture of our scholars. Our administrative system and

laws were modeled after the Chinese, although they were afterward greatly modified so as to become better suited to our own needs. So when we first came into contact with Europeans in the sixteenth century, we welcomed them and were eager to receive instruction in what they had to teach us. Christianity, likewise, was at first well received not only by the people, but also by men of authority and influence, until they perceived that behind it there was a great danger to the country. Even then they were desirous of keeping the advantages of foreign intercourse, if only they could at the same time keep out the dangers of Christianity; and it was only when they found that this was impossible that they had recourse to the extreme step of prohibiting foreign intercourse almost entirely. But while stringent measures continued to be taken against Christianity, the desire for new knowledge gradually became too strong to be resisted; the spirit that animated Maeno and his fellows in their efforts to read the "Tafel Anatomia" in their earnest search for truth is the spirit that has always animated the best element of intellectual men of Japan. This spirit, kept up in the incessant and untiring struggles of the Dutch scholars to introduce new knowledge among their countrymen under the shogunate, has blossomed forth under the wise policy of the open door explicitly enunciated in the fifth article of the memorable oath of the great Emperor Meiji, and under the sunshine of encouragement given to education and learning during his long and glorious reign. We flatter ourselves that at last we have succeeded in assimilating Western knowledge, and have now entered the comity of intellectual brotherhood; so that while we shall continue to learn from the West what it has got to teach us, we shall also furnish our quota, small perhaps though it be, to the common stock of the knowledge of the world.

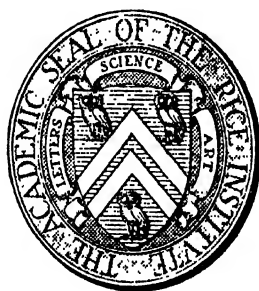


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THE SYSTEM OF THE SCIENCES

PRINCIPLES OF THE THEORY OF EDUCATION¹

I

THE SYSTEM OF THE SCIENCES

AT the moment when the Rice Institute undertakes to begin its public work and to organize the wide and splendid educational activity for which it was intended, I do not know of any subject that could affect the development of its future more extensively and more deeply than the problem of the System of the Sciences. Judged by its present state, the problem appears more like a pastime for idle minds than a practical question of far-reaching importance. For at the present time there does not exist a single system of this kind, generally accepted and universally employed, and the numerous attempts of various investigators to establish such a system have not yet received the recognition which, on the one hand, would be a guarantee of its effectiveness, and, on the other hand, an indication that by the establishment of such a system one has discovered, in a measure at least, the correct and suitable thing. Nevertheless, such a system is a crying need, as is apparent at the present moment, when we are confronted by the problem of attaining a complete survey of all conceivable and possible sciences and similar activities of the human mind for the purpose of

¹ Two lectures prepared for the inauguration of the Rice Institute, by Privy Councilor Professor Wilhelm Ostwald, late Professor of Chemistry in the University of Leipsic, Nobel Laureate in Chemistry, 1909. Translated from the German by Professor Thomas Lindsey Blayney of the Rice Institute.

sketching a normal and rational plan for the realization of the fundamental aim of the Rice Institute. It may suffice at first, as has happened in the case of this institution, to select somewhat at random indubitable branches of science—*i.e.*, to let ourselves be guided by the demands and the attainments of our time—in order to be sure that at its organization at least a part of the entire range of science has been incorporated. But in measure as the present plans widen and it becomes necessary to envisage more accurately departments of this institution which are to be developed in the future, the need of a rational system that will include the functions of science as a whole will make itself felt more and more imperatively, and thus we shall be able only to postpone, but not to avoid, the question that confronts us here.

If we look about us to see how the problem has been solved by the universities which have been founded heretofore for the advancement of science, from an educational standpoint as well as for the purpose of scientific research and development, we shall find, generally speaking, the traditional four, sometimes five faculties. To the oldest faculty—the theological—law and medicine have been added, and all of the remaining sciences are united in the fourth—the philosophical faculty—which here and there, on account of its wealth of subject-matter, has already been divided into two parts, the one including the natural sciences and the other the so-called mental or historical sciences. If one raises the question as to the reason for this division, it will be seen that it is to be looked upon as a sort of fossil, as the fixation of a condition which belonged to the oldest period in the historical development of these institutions, and was in keeping with them, and which at the present time has completely lost its earlier significance. We know that all sciences in the early stages of their development formed

one great whole, which, together with all other departments of human activity having to do with mental work and cogitation, was intrusted to the oversight of a single corporation—the priesthood. A division of labor came only in the course of higher development, when the sum of all knowledge belonging to the single disciplines continued to increase to such an extent that it could no longer be contained in the head of a single person. First of all, the sciences relating to the regulation of human affairs and those having to do with the healing of human diseases were isolated, and they attained to self-administration. This produced the law and medical faculties. This process continued to be repeated under most varied forms, and we may see down to the present day how new sciences have detached themselves from the joint association in which they and other sciences have been included, and demonstrated their independence by providing their own chairs, texts, and curricula. This formation of new sciences has recently become so common and so varied that for a long while the universities have not seen their way clear toward providing each and all of them with opportunities for development. Hence there has come about a sort of division of labor between the different institutions in such a way that this or that special discipline is cultivated predominantly and with particular zeal in one institution, and other new disciplines in another. This does not depend in general upon systematic causes, but rather upon purely personal reasons. Whenever there is a gifted representative of a new discipline who is an excellent teacher and at the same time scientifically productive, he will be able sooner or later to acquire the means and influence to develop this new discipline into a recognized science. By surrounding himself with a circle of students suited to his purpose he sees to it that the local influence which he exercises in his home university

spreads within a few years over the entire civilized world, from which he draws his students and to which they return again after having imbibed the new ideas and new methods.

However gratifying the process may be in a given case, it is impossible to look upon it as the ideal solution of the problem in the general development of sciences. For by the side of the fortunate ones who at the place where they were accidentally situated succeeded in acquiring the necessary means for developing their new ideas and rendering them effective, there are many with whom things do not go so well. Those of us who are more intimately acquainted with institutions of higher learning, be it in Germany, England, France, or the United States, will recall those personalities who upon closer acquaintance revealed an astonishing store of new ideas and far-reaching plans, but who had not succeeded in gaining sympathy at the hands of the proper authorities for these ideas and plans, and who therefore were forced to exhaust themselves in unfruitful attempts to develop them and make their value felt. At all events, our institutions everywhere lack at present an arrangement for organization by means of which progress of this kind in all departments of science may be wisely encouraged and developed. As a result of this lack of organization science does not progress like a group of well-regulated workmen, cultivating a wilderness with new expedients and methods, putting it into proper condition for the proposed work of civilization, but advances rather like the bold individuals who moved toward the West in the early history of the United States, one settling here, another there, wherever accident or inclination led them, and where the character of the region or climate appealed to each one, leading a highly individual and peculiar life in the midst of manifold difficulties and dangers, paying little heed to what had been their connection with their homeland and

its civilization, for the extension of which they had undertaken their daring expeditions. In other words, we must give up the accidental development of science hitherto existing, which depended upon where and how, as occasion offered, the new disciplines came to light and found suitable soil for their growth, and substitute for it an entirely reasonable, systematic, and carefully considered type by means of which we may render the new soil productive for science. Thus we may organize our progress so regularly and systematically that it will march steadily forward and bring about a gradual improvement that is in keeping with the present condition of existing knowledge and adapted to the most pressing and immediate needs of future knowledge.

For this purpose it is absolutely necessary, in the first place, that we recognize exactly and clearly the legitimate relations which exist between the individual sciences, so that we may no longer be dependent upon accident for their advancement, but rather that by means of this conformability to certain laws we can indicate, and will have to do so with more or less precision, not only in which direction science must be extended, but also what, approximately, will be the character of the anticipated extensions.

If one were to inquire in what manner the problems arising here could be solved, the reply at hand would be that we must take from the previous historic development of science those determining facts which would serve as a criterion for the future development of science. In fact, we shall be convinced farther on that the fundamental ideas for the development of science at which we shall arrive are to be noted in the history of the formation of the various branches of knowledge. But an historical phenomenon is such a varied and complicated affair, however, that while those portions of it which conform to existing laws may be recognized when

the light of systematic knowledge is projected upon their differences, yet without such a guide recognition of what is authoritative by the mere observation of things heretofore existing appears rather hopeless. For, to begin with, one must of course convince himself that a number of accidental factors have encroached upon the development of science, particularly that all the sciences have sprung from the necessities of the hour and therefore have not been determined at their origin so much by systematic or general points of view as by the more or less urgent nature of the necessity and of the possibility of meeting it immediately or in the future—a possibility depending, to be sure, upon a variety of unforeseen circumstances.

If we examine in this sense the four traditional faculties, we recognize in the first three applied sciences. The first faculty—the theological—has to do with the content and form of religious tradition and of religious education, and is to this extent essentially an historical science which, however, cannot free itself to a certain extent from development in a modern sense. Thus law is an applied science, since its object is the regulation of legal relationships between people; and its functions are essentially historical, since the legal works of the later Roman Empire are still looked upon as the most important and in many ways the final source of law. The medical faculty represents, again, an applied science—viz., the technique of healing, and more recently the technique of avoiding human disease. Finally, in the philosophical faculty all is included that does not find a place in the three “higher” faculties, and in it pure or abstract sciences are found, such as mathematics and history, as well as applied sciences, such as dentistry and pharmacy. Thus we see that the historical and traditional division of the sciences as practised in the universities is totally devoid of system,

and that the original purpose of the universities to serve as training places for the future clergy still makes itself outwardly felt as a standard for classification and administration at a time when the theological aim has long since been relegated to the background.

The irregularities and inconsistencies, however, do not end with these matters; for, in addition to the three applied disciplines first mentioned, other large fields have been newly formed in the meantime—I mention only the technical fields for which a place has been provided in the universities only in a very incomplete and meager fashion. In Germany, therefore, the technical schools have developed independently of the universities, and have as a primal object the culture of modern technical applied sciences. By the side of these, quite recently, numerous other institutions have arisen, such as commercial academies, schools for administrative officials, and the like, which emphasizes the fact that universities, even with the inclusion of polytechnic schools, are at the present day no longer satisfying all the demands for the scientific treatment of important questions of life which our many-sided, prolific age has evolved. At the same time it is an expression of the fact that experience has proved the old system of science in the universities to be totally inadequate. Hence, from the purely practical reason that each nation must necessarily and primarily look to an organization of its educational system that will be as complete as possible and sufficient for the future, the need arises for utmost clearness in systematizing science.

From such an organization we may expect a better employment of resources existing heretofore, not only from the point of view that necessary disciplines which through accidental, external circumstances have not yet been developed will be taken into immediate systematic cultivation and

be made ready for their social functions, but also from the other point of view that certain fields which have been traditionally regarded as sciences and have been correspondingly supported by the government and have consumed the resources belonging to them will be shown by a systematic examination of the idea and meaning of science to be of very much less importance than has been admitted in the past. Thus we shall be able to free the present development of science from many narrow conceptions and trammels that have consumed the means, everywhere limited enough at best, for things whose social importance does not justify the employment of resources that have been raised for purposes of social betterment.

In a word, the problem is to replace the former disjointed and accidental development of sciences with an organized and systematized one. Like every other department of human activity, science also rose upon the basis of development purely individual. Those persons who felt a special inclination and special fitness for this kind of work endeavored to form their external circumstances so that they could carry on scientific work without coming too seriously into conflict with the requirements of life. And the general public, though it at first received the results of such disinterested work slowly and not without a certain amount of questioning, especially on the part of a church unfavorably disposed toward science, has more recently accepted them with increasing willingness and gratitude. We are now just beginning to emerge from this period of accidental scientific development. Numerous scientific institutions that were equipped hitherto chiefly for the purpose of instruction have begun very recently to develop exclusively with a view to the advancement of science, uninfluenced by any side interests, and thus in a most far-reaching way have assured the culti-

vation and dissemination of science in all civilized lands. Therefore in our day the question of national systematization of all science makes itself felt with special emphasis in order that its development may be organized—*i.e.*, may be subjected to thorough, wise, and judicious control.

For what is organization? What is the meaning of this process that has proved to be of fundamental importance in all departments of our present social life? The word relates to the existence of the characteristic desired in living beings, in organisms, and it is among them, in fact, that we find the principles in question put into practice and their existence long recognized. We know that a living creature is all the more perfect in proportion to its having been able to develop proper organs for the varied functions peculiar to its existence, and in proportion to its assuring more completely the common and organized co-operation of these organs by means of a central nervous system. In connection with all organization there come into question two related yet distinct operations: on the one hand, a division of functions and their apportionment to special organs for the purpose of having each single function all the more perfectly carried out by the particular organ formed for it, and secondly, a co-ordination of these single distributed functions in the interest of their common service in such a way that each single organ carries out its activities, in point of space as well as of time, so that it thereby produces the greatest gain for the whole organism. Therefore the distribution of functions and the combination of functions are the very essence of organization, and so we shall not be able to organize science otherwise than by separating its functions and then by reuniting them in collective efficiency.

A suitable division of functions implies, moreover, a knowledge of the separate functions—*i.e.*, it presupposes a

general survey of the total range of the sciences, and demands therefore a system of them, and this is shown to be the great practical problem that must be solved if we are to organize scientific progress logically.

One occasionally hears the objection raised that an organization of the sciences is not to be thought of, for the reason that science is the highest manifestation of spontaneous mental activity, and therefore is to be gratefully received, but should not be consciously and systematically directed toward definite problems and fields of work. Such an objection is not justified, for the reason that all human progress in all departments rests upon the fact that those things which have occurred heretofore unexpectedly and by chance are transformed into a systematized harvest in the field of human activity through our recognition of relationships established by law. Such an objection in the face of science has still less justification for the reason that science in its very essence rests, as we well know, upon the systematic, logical, and rational ordering of single facts. Therefore, only a very undeveloped condition of science as a whole is indicated if it has not yet learned to apply to itself this process of ordering of which it has always made use as a fundamental principle in connection with its own subjects of study. Thus we see that the ordering of facts and their relationships in each individual science is the first and most important function in its development. A discoverer of new facts may not content himself with simply imparting these facts to the world at large, but only after having recognized and fixed them does there then arise for him the new, great, essentially scientific duty of demonstrating the relationship borne by these new facts to the existing condition of knowledge in a particular field, and of thus rendering them real, organic component parts of the entire science in question.

An ordering process of this kind in each particular science has always been the principle of all progress, and the fact that great fields of possible knowledge have already been mastered by man and brought into natural relationship postulates the possibility (contemporaneously with the need felt for it) of our beginning to attempt the solution of the greatest problem of this kind. We are therefore confronted by the task of subjecting the whole range of science to the same organizing and systematizing process which has been carried out so successfully in single sciences, to the advantage of society as a whole.

Let us now, with the help of historic facts, endeavor to come to a clear understanding of the leading features of scientific development in order to arrive at certain fundamental ideas by means of which, independently of accidental happenings in the zigzag progress of historic development, we may extend the facts which have been discovered into an actual system of science. We recognize three chief phenomena in the history of science, which we shall discuss in their proper order, that we may derive from them those fundamental notions for our system which they enable us to reach. We have already called attention to the first of these facts, that all the sciences gradually separate from some central or general form of knowledge which at the dawn of history was everywhere in the hands of certain persons whom we usually term priests, but who are to be regarded more properly as the representatives of the entire knowledge of their time. Now that which above all else in the early course of historic development was concentrated in the hands of the priesthood was the guardianship of the supernatural relationship through which man imagines himself to be connected with the unseen powers, and the separation of it from those fields of knowledge which appear to him to be

natural relationships. These latter are those things which are subject to the law of causality, in connection with which one is accordingly able to recognize the conditions which must be fulfilled in order that the phenomena may be produced, and may be able to control more or less the course of these phenomena. This process of development is going on continually, and is far from being completely terminated in our own day. We may say, however, that on general principles we do not recognize within the entire range of science any field of supernatural phenomena; that, on the contrary, we are convinced that every phenomenon that can form in any way the content of human experience may be comprehended in its logical relationship to other phenomena, and may be co-ordinated thereby in the total fund of human knowledge. In contradistinction to the earliest and rudest conceptions connected with the belief in spirits and ghosts, this idea of the existence of a field beyond the reach of science has disappeared more and more rapidly from our mental life; and it may now be said, without prejudice to any person's individual attitude regarding the religious views of our day, that all fields of human experience are subject to scientific treatment; that therefore the idea of natural law is everywhere applicable; and that, under like circumstances, like consistency in resultant phenomena may always be expected.

The second point which an examination of historic development enables us to recognize is that the pure and abstract sciences grow by degrees out of the applied sciences. We have seen already that originally all mental activity was united in a totality of knowledge administered by the priesthood; or, more exactly, that in the hands of the priesthood only that kind of knowledge was formed which was not the common property of all adult citizens, and which was there-

fore used only on special occasions. On the other hand, the kind of knowledge necessary for the accomplishment of the tasks of daily life, of procuring booty, of combating enemies, of cultivating the soil and acquiring the necessary products for clothing, food, and shelter, could not be confined, of course, to the administration of a few persons, but was the common possession of all, and was apportioned from father to son with correspondingly slow increase, and from one member of the community to another. We know that just at this point a division of functions took place, just as we have seen in the case of the distinct kinds of knowledge which were administered by special classes of people. While in the original forms of social activity each person exercised all the functions necessary for life and maintenance, it subsequently came about, at first slowly but later in increasing measure, that the technique of division and combination of functions—in a word, the organization of management—caused certain functions demanding special skill—for example, blacksmithing—to separate and attain to their own degree of technical advancement, with their own traditions. With increasing cultural development, knowledge became here, too, increasingly diversified and richer, and the division of functions proceeded farther and farther.

All of these fields of knowledge, however, were only applied sciences, and quite an extensive special development inside the applied sciences was necessary before there were formed in certain advanced members of the human race new activities by which knowledge for its own sake, without any immediate reference to any application of it, came to be regarded as a vocation and aim in life.

European civilization began in this respect with an unusually rapid and brilliant development among the Greeks. There, owing to previous economic development and to the

formation of a small group of well-to-do men whose wealth was based on an extensive slavery, there arose men with sufficient leisure to direct their vision beyond the mere necessities of the day to more general problems and discussions. So we see that the early beginnings of pure science took the form of philosophic systems—in the first place, that of the Ionian natural philosophers. It was no longer a question of how one might satisfy the needs of the day more easily and to better purpose, but rather, since the needs of the hour no longer occupied these men, problems were sought in more distant fields.

Thanks to a well-known peculiarity of the human mind, the range of problems envisaged by them soon became extended to the utmost limits. Questions relating to the origin of the world, the manner and means by which living beings might have come into the world, and, after these, questions concerning the purpose and aim of human life, were the ones that busied these first thinkers. At the same time we notice that the pleasure of making use of this new organ of human activity—the capacity for reflection—soon led to extensive exaggerations in its use. Instead of supplementing in proper sequence the answer to questions relating to immediate surroundings, both as regards time and space, with solving more distant problems from remoter times and space, they ventured upon the remotest imaginable confines of time and space. It was only natural that these first activities of the newly developed thinking faculty in man should soon go astray in these distant and uncertain regions. A hard and long training was necessary before mankind learned that the newly grown wings could not, after all, bear them beyond the atmosphere of the earth, and that the first bold and illogical flights into unbounded space could only lead to the miscarriage of such impossible undertakings.

So we see how Greek philosophy turns back more and more from the excesses and capricious ideas of its early days to the realities of life and to an analysis of the capabilities of the human mind. We have received, unfortunately, only a very incomplete and highly one-sided and biased account of those days. Nevertheless it can be seen from these few literary remains that the Greeks had already entered upon a course which approached quite nearly to the modern development of the sciences, but which for that very reason was in complete contrast with the older traditions. This was the school of the Sophists, which demonstrated by its activity the inadequacy and complete inaccuracy of the first endeavors of youthful thought, and which, very logically, was accustomed to emphasize experience as the only reliable source of all human knowledge. These first germinations of scientific activity among the Greeks were in large measure repressed and destroyed by the great political upheavals which began some two thousand years ago.

Only a very small part of this mental stimulus was assimilated by the Romans and rendered fruitful of good; only a slender thread of tradition leads from those days, by way of Arabian translators and commentators, to the beginning of modern times, when the peoples of central Europe who had in the meantime become accessible to culture began to take part independently in the cultivation of science and of the reflective qualities of the human mind. The restriction of all medieval development to imbibing and discussing the traditions of the Greek philosophers resulted in the fact that during this time no new important intellectual productions were brought to light. In the same manner, the destruction of technical culture by the incursions incident to the migrations made it necessary that the stores of applied knowledge that belonged to varied fields of daily and social life, and

which were lost at this time, be slowly gained anew while a corresponding new technical culture on the part of these fresh peoples was slowly reformed. All these preliminary conditions were so far developed in the seventeenth century that at that time a phenomenon could take place similar to the one that had occurred among the Greeks a few centuries before the beginning of our era. For there arose again, on the basis of the general culture attained at that time, individuals whose thoughts were turned to science as such, and who, by systematically collecting what was known up to that time, put the human mind in possession of a disproportionately far-reaching power for overcoming terrestrial conditions. The historical appreciation of these events is rendered somewhat difficult, because at this time new sources of Greco-Roman tradition were opened, and especially because the artistic productions which had been found dating from the period brought before the eyes of modern artists new solutions of their problems that differed entirely from those which they had found previously in the course of their natural development.

This rehabilitation of Greco-Roman art in sculpture and architecture, as well as in poetry, is what one consistently terms renaissance. The learning, however, which developed in the province of mathematics and physics cannot be counted as a part of the renaissance movement. This development has in common with the former only the factor of time; it stood, however, in entirely conscious contradiction to rehabilitated tradition. While the artistic renaissance consisted in taking over the completed works of art of the past, as regards both content and form, and holding them up as unattainable ideals for the artistic movements of the day, the new sciences were in no wise developed as a rebirth of the sciences of antiquity, but rather in sharp and definite

contrast to them. It is characteristic that the Greek traditions in mathematics, for example, as contained in Euclid's geometry, did not lead to any kind of special development in geometric science; that, on the other hand, a new discipline that could not be traced traditionally in any way to the Greeks—algebra, and afterwards differential calculus—opened very extensive and important new fields to mathematics, and so, for the first time since those days, caused new scientific ideas and methods to appear in history as the original product of the peoples of central Europe. We find in the same way that the fundamental progress in physics, as brought about in the province of mechanics and astronomy by Galileo and Copernicus, arose in conscious and sharp contrast to the traditions of antiquity. In the truly fundamental investigations of Galileo concerning the mechanics of bodies falling freely, special reference was made to the false and untenable view previously held by force of tradition, and which was based upon the observations of Aristotle concerning this problem; and thus in a thousand other particulars can be shown the position of conscious contrast which the new sciences were forced to occupy toward the many traditions of Greek science.

In the few centuries which have passed since these beginnings a development in science has been accomplished which is incomparably greater and more varied than that attained in its first flower among the Greeks. And, judging from the progress which this highest attainment of the human mind has made, one may prophesy with certainty that the extraordinary development which has taken place down to the present time will be only the small beginning of incomparably greater further development, and that this science which, in the two or three centuries that it has been under the control of mankind, has already accomplished so very much in the

transformation and betterment of our life, will exhibit a much greater and more important range of activity still, both in the near and in the more distant future.

If we ask what this development means for us in respect to our chief problem—the system of the sciences—we cannot fail in general to recognize that an absolutely definite sequence can be shown in which the various scientific disciplines have appeared and have been developed into their first florescence. The first real science which we received from the Greeks was mathematics, especially geometry, and so we see also, on the occasion of the new flowering of science at the beginning of modern times, how mathematics stepped at once into the foreground of scientific interest. It reached at once such an unusual height of development with the discovery of differential calculus by Leibnitz and Newton, that all the performances of the past were left far behind, and our present mathematical knowledge still stands completely under its influence. This course of development is so characteristic that we can now say with certainty that the highest development of mathematical knowledge is already a matter of history. A wealth of unexpected, new results and prospects, such as the development of differential calculus and of its nearly related disciplines has brought with it, does not now exist in mathematics. Though year by year new progress may be noted in this oldest department of pure science, yet at the present time it is merely a question of extending and widening the fundamental ideas already existing, and we cannot mention a single mathematical discovery in the entire past nineteenth century that could have influenced the thought of the age in a way that even approached in importance and fruitfulness the discovery of differential calculus a century and a half before.

Following mathematics, astronomy—an applied science—

and physics were developed. This development began with mechanics, and was then extended to the fields of optics, heat, and electricity. We are not accustomed to recall the fact that the voltaic pile, for example, upon which the theory of the electric current is based, was not discovered until the year 1800, and that this entire field, therefore, which to-day, under the guise of electrotechnics, has so profoundly transformed our economic life, is scarcely more than a century old. Chemistry is even more recent than physics in its various disciplines, and began its scientific transformation only toward the end of the eighteenth century; in it, as in physics, we may experience from day to day the most astounding and unexpected extensions of our knowledge and views.

A whole series of other sciences—on the one hand, the biological; on the other hand, the so-called mental sciences, especially language, history, and finally sociology—was developed in the course of the nineteenth century and formed into sciences. This formative process is far from terminated, for sociology, as an example, is still occupied almost exclusively and above all things with inquiring upon what fundamental ideas its claims to being an independent science rest.

In this short review of the total development of science we can already see something like a system. We can say that mathematics and mechanics are about the simplest that we are able to discover in the whole variegated gathering of present knowledge, and that the sciences which appeared later, as of course was necessary psychologically, made their appearance later in proportion as their problems became increasingly more complicated. Unquestionably the problems of sociology, which has to do with the whole development of human culture, are disproportionately more complicated than, for example, the problems of chemistry,

which have to do with the reactions of objects without life and under uniform conditions.

We may derive, then, from these observations the three following facts. First, that we shall renounce in any scientific system the consideration of all supernatural relationships, of whatever nature, and that, on the other hand, from the very nature of things we shall extend our scientific problems to each and every field of human experience; secondly, that we must differentiate carefully between applied and pure (or free or theoretical) sciences, and in doing so we shall find the accidents of life and of origin principally in the sphere of applied sciences, whereas we shall look for theoretical and methodological relationships wholly in the pure sciences; and, thirdly and finally, that the general historical development of science also places at our disposal a clue for the systematic envisagement of all science by reason of the fact that from among the individual scientific disciplines the simplest arose and were developed first, and that, in proportion as the reliability of the human mind in mental operations was developed, the more complicated and diversified fields of experience were gradually submitted to science. We shall have occasion to subject to careful examination this last thought, especially regarding the increasing multiplicity of scientific subjects, since in this field we may expect first of all to find the solution of the problem regarding the rational systematization of all the sciences.

In order to find this general principle that has been sought, we shall first have to meet and answer the question, What is the general characteristic, the real essence, of science? It is evident that for the division of all science, only that peculiarity of it can be serviceable and effective which occurs to the same degree in each science, and which, therefore, is common to all. We may discover this common constituent

part all the more readily if we call to mind the origin of each individual science in such a way that we take into consideration not the special content of knowledge, but rather the manner and means of the formation of knowledge. Thus we now observe that every individual form of knowledge develops into a science after having been cultivated previously as a technique. The fact has already been emphasized that all sciences have had their origin in the needs and desires of life. From the fact that certain needs occurring frequently and regularly, such as those pertaining to food, the healing of the sick, administration, the building of homes, the making of clothing, etc., etc., have been met regularly from one generation to another, there have been accumulated a quantity of experiences which are handed down from father to son, from master to apprentice, and soon form a more or less important proportion of a particular science. This knowledge indicates in each case not only how things have previously come to pass in one way or another, but it points to what must be done in order to attain to any particular future results. Such a knowledge of the future is, for example, that in making bread one not only has to put the flour mixed with water in a hot oven, but that one must let the dough stand twenty-four hours or more beforehand, because otherwise the bread will not be sufficiently light. In the same way certain processes are worked out, for example, such as forging and hardening iron, and similar conditions may be found in every other field of knowledge. This means, in other words, that every branch of learning rests upon the knowledge of certain laws of nature, certain successions of phenomena, which are regularly repeated; and every technique is based upon the fact that one determines the hypotheses or preliminary conditions of every such succession of phenomena, so far as is desirable and suitable for

the work in hand, in order to bring the phenomena to a normal issue.

Every technical branch—and along with it, to an even greater degree, every science—has as its object, therefore, the attainment of future happenings by means of suitable preparations. It means, therefore, in the first place, foreseeing the future, hence forming the future. Both possibilities have their limits. One can foresee the future only in part and for a relatively short duration of time, and one cannot prevent many approaching events, even when it may be desirable to do so, because the means for altering future occurrences are more circumscribed than those for foreseeing them. But, nevertheless, the number of things which may be foreseen and influenced is continually increasing in proportion as knowledge, and therefore in proportion as science, reaches farther.

All prognostications of this kind depend for their part upon the circumstance that certain groups of phenomena always occur conjointly. The groups may not be connected as regards time; in such cases it is a question of objects, or subjects, of our experience such as are included in the nouns "horse," "stone," "fire," "sky," etc. Each of these words indicates a definite accumulation of experiences, repeatedly gone through with, which have the special characteristic that as regards time they are always to be observed connectedly. These peculiarities that are observed coincidentally are called the characteristics of that particular thing, and the technical as well as scientific knowledge of this thing is all the better and more developed in proportion as characteristics and relationships are better known. The most frequent and best known of these kinds of groups are given definite names, as we have just seen. Those which are less well known and which have been investigated only in the

course of conscious endeavor are expressed more commonly through rules and natural laws. However, in both cases it is a question of the relationships of definite single happenings or single characteristics; and prognostication depends in any case upon the fact that, after taking cognizance of some few of these characteristics, one finds himself in a position to predict the others also. Thus the primitive huntsman, for example, contents himself with the optical picture of game well known to him in order to set out at once to pursue or kill it, though he has not been able to discover from experience that it can be killed and transformed into food. Since, however, this experience has been met with in connection with similar things on previous occasions, he dares prophesy that it will also be so in this case; and this prognostication, therefore, is sufficiently certain for him to expend trouble and labor upon the killing of the game. In a somewhat more advanced period of cultural development this ability to foresee events is even extended considerably further, in that man intrusts seeds to the earth with the foreknowledge that in proper time they will grow, that the resulting plants will bear fruit of like structure and in such quantity that the measure of grains used in sowing will be abundantly replaced.

In this manner one can work at will through the whole range of human activities and knowledge, and the general fact will always be encountered that all conscious performance rests upon a knowledge of the regular temporal relationship between different experiences which recur in the same way. Thus all knowledge consists in group-memories by means of which certain definite amounts of experiences, happening simultaneously or in sequence, are included from time to time. Through the general psychophysical nature of all living beings, repeated experiences affect the individual

experiencing them otherwise than do single or varying ones. They become possessed of a special characteristic which, in connection with conscious living beings, we term remembrance or acquaintance. Upon this recollection of regularly recurring associations, or our acquaintance with them, depends our power, at first more instinctive, later more conscious, of foreseeing and anticipating future events. Such associations we may comprehend under the general term of concepts, in connection with which it is well to repeat emphatically that natural laws are also to be classed under concepts; for they represent relationships, just as the ideas "horse" and "stone" represent associations of definite occurrences that may be experienced, or characteristics connected with the object in question.

Such a formation of ideas has a purely technical character at the beginning—*i.e.*, only concepts impress themselves in the consciousness of primitive man by repetition and a corresponding awakening of interest as relates to experiences which are important to him for his existence. He could form for himself, for example, ideas or experiences concerning the many thousand plants which he has the opportunity of observing daily. He confines himself, however, to those plants from which he derives a special advantage or harm, and avoids the forming of ideas concerning less urgent objects, for the reason that they have no known importance to him, and because for that reason he shuns the efforts (and evidently they must have been very great in the case of primitive man) necessary for such a formation of ideas. One may observe this condition of mind in all possible gradations among races which are but slightly developed, whose characteristics and psyche have become well known to us in recent time, thanks to the many anthropological investigations. We may thus observe all the stages, from the most

circumscribed formation of ideas, which extend only to the most urgent necessities of life, up to the very highest development in this sphere, such as may be found in the mind of the modern investigator, discoverer, or organizer.

These considerations now lead us to establish the essential difference between technique and science, or, as one may more properly express it, between applied and pure science. Technical knowledge, from its very origin, gravitates around certain necessary or desired things, and all knowledge is created and collected in respect to the accomplishment of the task that underlies this relationship. Whenever a technique is followed, however, for a considerable length of time, and is developed to even greater completeness, it always happens that new circumstances arise from time to time which cannot be controlled by existing knowledge, but which demand rather the acquisition of new knowledge. The more varied the knowledge as regards the events which occur more infrequently is, the more experienced, the better informed, the wiser the person in question is. The necessity of being prepared for unforeseen cases causes finally a certain inclination of mind in accordance with which, even without any thought of a particular task's lying just before one, a condition of preparedness for all possible problems appears to be a desirable state. Accordingly, one will strive not only to become acquainted with the material employed by the technique in question with reference to its immediate application, but one will endeavor to investigate it from so many sides and so variously that the future occurrences in that technique may, in so far as is possible, offer no further surprises of any kind. It should not be stated that this train of thoughts is the only one which has led from technique to science. But, so far as we can historically see from the statements of those who have created a science out of technique,

this general impulse to know more than the needs of the hour require, and to be prepared for all eventualities, has been, after all, a prime motive power everywhere for the carrying out of research work.

Since the necessities of life are always transformed, according to the well-known laws of natural selection, into activities which promote happiness, because the beings that gladly and readily perform the necessary thing are, in the struggle for existence, especially preferred as compared with others, it is also to be expected that the necessity for logically controlling phenomena becomes by degrees a passion for knowledge. This passion for knowledge is a variation of the racial type, the origin of which is therefore to be expected only in a very few extraordinary individuals. And so history teaches us that the investigator, the man who, independently of any technical application, though possibly incited by it, feels the general impulse to extend his knowledge and to shape it into greater effectiveness by a process of rational comprehension, was originally a sporadic phenomenon. It is to so small a degree a question of professional investigation, that in the case of the first investigators in each special department we cannot help observing just about the opposite. Those who content themselves with handing down existing knowledge look upon every extension and renovation of intellectual materials as a wrong done their efforts, and take a most energetic stand in opposition to any possible change in pre-existing functions. So these greatest and most decisive benefactors of mankind, the men who have endeavored to transform the short-sighted technique of their day into a correspondingly more far-sighted science, have almost always been persecuted and oppressed. And though investigative activity in our day is no longer fraught with danger to life as it was three or four centuries ago, and

though in our scientific institutions attention is generously and readily given to carrying out investigations, we see, nevertheless, that even in the twentieth century the profession of the investigator as such is found only sporadically as yet. Professional appointments of this type exist in the form of research professors in the American universities and members of the research institutes of Germany, and certain professoriates in the old English universities, Cambridge and Oxford, as well as a number of professoriates in the Sorbonne in Paris. All the other positions in which research work is now being carried on permit this work only as a species of minor office, the men in question being appointed either as professors for the instruction of students or for some other regular activity which, to be sure, has some factitive relationship to their research work, but is quite secondary to it so far as their outward position is concerned. To find means new and universally applicable by which research work may be regularly overseen and encouraged by society, whether by the government or by narrower groups within the government, is a great task for the twentieth century and for this institution now in process of formation; the question of a logical separation of instruction and research will also be of vital import, if the Institute is to attain to the high aim which its founders have set for it. In other words, the relationship between research and teaching must be organized. Each of the functions must be developed to the highest possible point of efficiency. And since along with a division of functions the co-ordination of functions is also important to all true organization, care must be taken that a member of the Institute who is occupied chiefly with research work shall have an influence upon its entire intellectual activities which is proportionate to the extent of his ability and his tasks.

We have seen how the Greeks, immediately after the discovery of the enormous power that comes with the development of ideas and laws, in the freshness of their youth soon greatly exaggerated their view of the effectiveness and productiveness of this new intellectual instrument. Instead of allowing the formation of concepts to depend exclusively upon experience, as the very nature of the matter demands, the Greeks, as soon as they had experienced the workings of abstract intellectual activity, attempted to increase it to the very furthest limits. Instead of forming for themselves conceptions about the nature of the earth, about the laws governing the growth of plants and the propagation of animals, about weather and clouds, in keeping with actual conditions, they soon extended their speculations to the most universal and unattainable problems, such as the beginning and end of existence, the nature of the entire visible and invisible world, and thus took as a subject for their meditations those ultimate characteristics of bodies physically perceptible which are far beyond the confines of perceptibility. Such intoxication in the use of this newly discovered intellectual power is readily explicable, but we must always keep before our minds the fact that it is only a species of intoxication and exaggeration of a means newly won with which we have to do, and we must not consider the intellectual accomplishments in the sphere of speculation that date from that youthful period in man's development as unassailable and unsurpassable master-accomplishments of ripe intellectuality.

Greek speculation is an expression of childlike pleasure at the new intellectual acquisitions. Just as a child, after having overcome the first difficulties of speech formation, cannot repeat and vary the art just learned enough, so, too, in connection with the Greeks we see the theoretical or abstract

thinking—*i.e.*, that which has only its very earliest origin in common with the necessities of life—developing in a great variety of forms, but leading only in rare cases to a lasting and really fundamental result. So in geometry Greek thought created a theoretical or pure science (probably in close conjunction with the empiricism of the Egyptian surveyors), which found its classic expression in Euclid and in this form influenced most profoundly the later development of the science. Since the Euclidean form, however, is only the product of a very long and thorough study of this science, and, therefore, does not consciously contain the slightest trace of its genesis, this presentation of geometry is anything but suited to introducing the formative mind to the way in which science has its origin. It is only typical of the manner in which science, which has already developed prosperously to a considerably advanced stage of completeness, may be logically co-ordinated in accordance with known principles.

An insight into this relationship is essential to all the questions pertaining to instruction and education. The conception which has been current for centuries, that the geometry of Euclid is an especially good means of training for the human mind, is incorrect in so far as one places any important degree of weight at all upon the development of the capacity for discovering new relationships and principles, for forming new concepts out of the chaos of varied experiences for the advantage of mankind. For this there is not the slightest introduction in Euclid.

So we see, then, that after the overthrow of medieval barbarism, through which there ran only a slender thread of earlier cultural traditions, the entire science of the time was occupied with the task of developing this tradition as completely as possible. The real key to it was the knowledge of

ancient languages. For a long time men contented themselves with Latin writings, until finally, owing to a series of accidents at the beginning of the sixteenth century, the Greek language and Greek tradition became known in central Europe and gave impetus to great movements which were called the Renaissance of art and letters. This Renaissance had to do primarily with art; secondarily, under the name of humanism, with literature, which, by way of the long circuitous route through Arabian translations, became known to the peoples of central Europe, who were once more struggling upward. Independently of these, modern mathematics, then physics and chemistry, arose, as we have already seen from what has been said.

The fact that, owing to the Renaissance, the predominant occupation of the time was on the language side of classic tradition was brought about because the ancient works in the course of their transmission had undergone extensive disfigurement and harmful changes, so that the reconstruction of the original, genuine text was an important preliminary condition for attaining their real content. As is almost unavoidable in such cases, the means was gradually made the end, and the treatment of the corrupt and disfigured texts by means of the apparatus of linguistic criticism became, without any consideration for the content that might possibly be arrived at thereby, the subject-matter of zealous and devoted labors, whereby the results stood completely out of proportion to the efforts expended. Through this circumstance a thread of pseudo-science developed by the side of that thread of real or empirical science which has been described above.

In our universities there may yet be found a great number of men occupied with the same tasks with which culture, just beginning to emerge out of barbarism, was compelled to busy itself at the beginning of modern times, in order to

disclose the only fountains of culture existing at that time—the traditions of classical writings. At the present time, in all sciences without exception, we have far surpassed the stage reached by the Greeks and Romans. An objective, therefore, for expurgating the traditions from those days, by means of the apparatus of philological criticism, no longer exists; owing, however, to the law of the conservation of form, this work is still being continued down to the present day. And a goodly portion of the respect that was paid to this activity, and with some degree of justice, three or four hundred years ago has been maintained down to our time, when work of this nature has completely lost its former importance and has not in the meantime attained to any new significance. I know full well that with such notions I am placing myself in contradiction to the majority of my contemporaries who are studying the problem of the sciences. But at this important opportunity I cannot refrain from calling attention, with all possible emphasis, to the conclusions at which I have arrived on this question. The whole province of the so-called mental sciences,—above all, classical philology, and in connection therewith many other historical disciplines, are nothing but passing phenomena which do not proceed from the continual ascent in the development of civilization, but rather from transitory waves in this great stream. In their own place, in so far as it is a question of the proof of certain stages of culture and their peculiarities, this knowledge has still a certain value; but it stands upon the same plane of importance, for example, as the knowledge of the development of the ancient Mexican civilization, or that of China or any other, and it is out of the question to attribute indefinitely this predominant importance to the history of the development and content of Greek civilization which by force of tradition we still concede to it.

And in measure as the general laws of the development of culture become better known (we shall return later in proper connection to this problem), in the same proportion also the knowledge of a particular case will lose in importance. For when the general law is known all the individual cases are known along with it, and there is no need of studying a special case more thoroughly than is absolutely necessary for the clear and definite ends in view.

To whomsoever this judgment may appear severe or unjust, I would beg him to call to mind the fundamental definition of science at which we arrived in our study of its historical development. Science exists for the purpose of prophecy; a science, however, which confines itself to gathering information in the most exact possible way concerning the minutiae of some past epoch in the development of a certain people—as, for example, Greek archæology does—foregoes from the very start all claim to the character of a science and confines itself to representing a branch of knowledge that possibly at some later time (when it becomes impregnated with more general interests in the wider field of mental activities) may serve as material for a science, but in itself is in no wise a science in the general modern sense. The same thing is true of the relatively modern discipline of comparative philology, which also has limited itself in its functions up to the present exclusively to determining what has existed, or at least still exists, with respect to the various exceedingly diverse and therefore accidental forms for the signs—but slightly subject to intelligible laws—which different groups of humanity have co-ordinated with the ideas they have formed. However well one may know the past and present of these formations, one has not attained in the slightest degree to anything in the nature of true science. Such a thing could occur only if one employed the

knowledge of the past and present for the prevision of the future, and, whenever possible, for preshaping it. This leads us to the true task of linguistics, namely, to the task of setting in place of (or at first by the side of) the more and more impossible multiplicity of national languages, which have originated within narrow circles, a new general language, free from all the imperfections and shortcomings possessed without exception by all those formations that have risen by accident, and uniting all the advantages and special auxiliary means that it is possible to observe in the individual languages for the fulfilment of the purpose of attaining an exchange of thoughts as rational, simple, and unequivocal as is possible. In the same way, chemistry was an exceedingly incomplete science,—indeed, it was only the beginning of one so long as it confined itself to the analysis of the materials at hand and to the determination of their characteristics. Chemistry became an all-transforming science only after it had learned, on the basis of the knowledge so obtained, to form limitless quantities of new materials with new characteristics,—in fact, to seek consciously and to gain synthetically materials with definite characteristics, concerning the existence of which nothing was known up to that time, but whose manner of production and whose presumable characteristics could be foreseen on the basis of the scientific knowledge already attained. In precisely the same way we must employ our present knowledge concerning the formation and transformation of language in order to construct a really complete and universally available language which may serve for the general intercourse of mankind, at first by the side of, and perhaps at a very remote date exclusively in the place of, the national languages which have arisen by accident.

These considerations, which in an analogous way we may

extend to history (whose present scientific representatives for the greater part also still refuse to employ their knowledge of what has transpired in the past for a logical pre-determination of the future), teach us that the group of so-called mental sciences at present correspond much less to the real substance of science than do the natural sciences. Nevertheless, we observe how the natural sciences, ascending from the simpler to the more complex, become more and more imbued with scientific method and with the true idea of science, which looks toward prediction, and the approach nearer and nearer to the ideal thus characterized. So physics and chemistry in large measure have already reached this stage, while biology is most zealously engaged in endeavoring to attain to it. And in very recent times we have seen a group of sciences adopting the same methods, and with their assistance making great strides in the direction of human progress and culture. I refer to the cultural sciences comprised at present under the name of sociology. The mental sciences, of which we have just spoken as being undeveloped, are gradually being taken over by sociology, and are being fructified and rejuvenated by the application of general scientific methods. And so in our own day a renaissance of science is beginning to be felt, which, however, unlike that of the artistic Renaissance, does not confine itself to a relatively short space of time, but rather began three hundred years ago, after the rebirth of the sciences in central Europe; and it has experienced, and must still experience, especially at present, great and important changes in the entire thought of the time (as example I mention only the transformation of our conception of the nature of legal relationship due to the irresistible socialization of jurisprudence in our day).

These observations lead us now with absolute certainty to the chief point of our problem,—to the question, According

to what principles are all the sciences to be divided? We have seen that the element common to all the sciences is the formation of ideas and the investigation of the relationships between the ideas thus formed. And we shall have to seek, therefore, a basis of division for all the sciences in the nature of the ideas with which the various sciences are busied. We see at once that such a division cannot be employed in connection with the applied sciences, which are a product of the physiological and psychic requirements of the human race and of the accidental climatic and local conditions incident to its development, but that a system of this kind can be found only in connection with the pure sciences, which are independent of such sources and motives, and which are directed merely toward the solution of relationships belonging in the field of concepts. Just here an exceedingly simple and perspicuous system presents itself, which provides us with the frame within which all human knowledge may be logically and methodically included, both in the form in which it exists at present and in whatever form it may assume in time to come.

When we consider, therefore, the various ideas which humanity has formed, and which have been brought into order by science, we find in them the following fundamental difference. There are certain ideas which are the fairly immediate results of experience, and which have retained in consequence a relatively large proportion of the inexhaustible diversity which every experience brings with it. Such concepts, for example, are "man," or "tree," or "government," etc. Since, however, the entire content of a single experience does not serve each time for the formation of ideas, but only those common portions of each experience that occur in a great number of them, therefore every idea is poorer than the single experience which can be associated

with the idea. In every single horse one is able to show more individual differences than are contained in the general idea "horse." Hence we must take no note of a certain part of every experience, or, technically speaking, we must abstract from it, in order to arrive at the general idea in question. Now this deduction may be carried more or less far,—it may be carried so far, for example, that the idea "horse" is still retained; it may, however, be carried, if we include "horse," "dog," and "butterfly," as far as the much wider term "animal," whereby we abstract from the special peculiarities of particular animals, and take account only of certain common peculiarities, such as assimilation, oxidation, locomotion, reproduction, etc. One can imagine this process of abstraction extended until we shall finally arrive at notions which are applicable to practically all experiences, but which on that account have sacrificed most of the peculiarities of each single experience. In fact, they can retain only such peculiarities as occur in all experiences, and which, therefore, are of the most general character possible.

Thus there will always exist a reciprocal relationship between the diversity of the single characteristics, or parts, included within an idea, and the number of experiences or things in general which can be brought within this idea. The richer an idea is as regards content, the smaller it is as regards its range, as regards the number of individuals that come under this idea, and *vice versa*. This is a relationship which is universal and which therefore represents the principle sought for in the division of ideas and thus in that of the sciences. We begin with a science having reference to ideas of the widest range and least content, which accordingly predicate something about each and every experience, but can make only circumscribed and very general predications about these experiences. We can then ascend to con-

cepts which have a richer content, but which on that account also refer to a narrower range of experience, and we can thereafter continue this process step by step. Since every idea must have a definite wealth of content and a definite range, which must fall between the furthestmost limits of the most general and far-reaching ideas, on the one hand, and of the richest and narrowest concepts on the other, so we see that according to this principle we can actually dispose of all ideas, each in its own place, and that a systematic arrangement of all conceivable and possible sciences, in the order of narrowing range and increasing content of the ideas, gives us the certainty of logically encompassing all human thought and hence all the human sciences possible.

Before we undertake to carry out this general idea, there are perhaps a few words to be said about the real task of science in connection with the study of concepts. In accordance with what has been said, in order to have the totality of science, it should suffice to enregister all existing ideas in accordance with this principle of content and range, and to group similar ideas. Such a notion is, of course, entirely incorrect, and the error arises from the fact that we have tacitly considered the materials of our ideas as being complete and correct. Actually, however, no single idea represents an enduring and unchangeable image; rather is it constantly subject to new treatment, owing to the development of special knowledge and to the increase of our experience. This development, on the one hand, takes the direction of causing us to discover new elements of the idea which previously had not been known. For example, every investigation of the action of any substance in chemistry produces new facts of this kind, which contribute to a more exact characterization of the idea of the particular substance—*i.e.*, to a more extensive differentiation of its content. More-

over, the ideas as first formed by man have not in many cases been grouped and delimited most adequately; and there is a second kind of concept-making going on continuously in all science, which consists in our so altering the range and content of the idea as it was originally determined, and so analyzing it or grouping it with others, that a more logical—*i.e.*, a more distinct—division and arrangement of the ideas are rendered possible in a way calculated to bring out more clearly the existing relationship. It is thus that we gradually approach the solution of the standing problem of science, namely, by rendering as innocuous as possible the effects which the process of abstraction, in necessarily limiting experience, produces in every concept; by endeavoring to emphasize as completely and as diversely as possible the elements of the idea which remain after this process of abstraction, and to determine from every point of view their present relationship within the range of the idea.

Furthermore, there exist relationships between the various ideas which had not been recognized at the time the concept was formed. To discover these relationships is yet another exceedingly complicated and varied problem of science. It forms the so-called deductive part of it, while the determination of the ideas and their content is usually called the inductive process of science. Our results are not very satisfactory when we attempt to represent these two kinds of activities as opposed to and independent of each other, for real scientific work results from the uninterrupted employment of both methods. But few sciences have developed to such an extent that the deductive part has gained ground, as is the case, for example, with geometry and already to a certain extent with thermodynamics.

So we have now made the necessary preparations in order

to undertake in detail the formulation of the pure or abstract sciences. For this purpose we shall next endeavor to find the very widest general idea with which any experience or object one pleases may be co-ordinated, which therefore possesses the greatest compass of all conceivable ideas, and in addition, of course, the least imaginable content. This concept has no definite name, for its establishment is necessary only for the purposes of pure science. In every-day life a concept so comprehensive and so poor in content finds no suitable application. We shall therefore experience a certain amount of difficulty in designating adequately this concept with the help of language. Whether we speak of a thing or an experience, of an object, or of anything else which approaches this concept, we run the risk of ascribing too great profuseness to its content, hence too much narrowness to its compass. We shall, therefore, content ourselves with the description that this most general idea—to which, in order to be able to speak of it, we shall ascribe the name “thing”—has no other characteristic than that it represents an experience which can be differentiated from others. So long, indeed, as all experience is felt to be a regular, invariable sequence of situation, there can evidently be no question of any conceptual activity. Only when the different portions of our experience react differently upon us, and those which are similar and coincident are included to the exclusion of the others, do the first traces of conceptive activity appear. Thus there occurs automatically and unconsciously the differentiation of our experiences and the arrangement of the corresponding parts, owing to that general characteristic of living beings which has been called by Hering, in the widest sense, memory—the basis for all concept-building in general. In this sense a thing is everything

of which we are aware and which we can feel to be different from other things—a thought just as well as a house, a sensation of pain as well as the Milky Way, etc., etc.

A science of this thing alone, without further content, is impossible; for all that can be predicated about it is limited by our definition to the fact that we can differentiate it from others and recognize it again on the occasion of its reappearance in our experience. In order that a science be possible, we must therefore be able to bring somewhat more content into the idea. This content consists, in the first place, in our not limiting consciousness to a single thing, but in combining a number of things which appear as belonging in any way together into an association or group. As soon as we do that we get at once a whole number of possibilities of testing certain experiences in connection with such groups, and of setting up certain laws of nature which express these experiences. If, for example, we have, on the one hand, a group of children, and, on the other hand, a number of apples, we may give each child an apple and we are quite certain that one of the following cases will arise. Either each child receives an apple, or, after giving out the last apple, some children are left over, or there are apples left over after the last child has received an apple. There can be no other situation—*i.e.*, in other words, we have never experienced the occurrence of other possibilities when we co-ordinate the members of one group singly with the members of another group, as has just been described.

The usual way of expressing this law—that, of two things, one is either like or greater or smaller than the other—is somewhat too narrow, because the idea of number is included, which we arrive at only in connection with a later development of the considerations we have suggested here. In the same way, the philosophical law regarding the ex-

cluded middle, which is recognized as one of the fundamentals of logic, is only a special case of the general law of co-ordination, whose relation to the general law I need not explain further. At all events, we see that even in the case of an exceedingly general operation, as in the case of inclusion of things into groups and of the co-ordination of these groups with one another, very definite peculiarities conformable to law soon appear, which we find again in every single case, whatever may be the content of the group in other respects. They have, therefore, no distinguishing mark other than that one can merely distinguish one from the others. We may sum this all up in the statement that, of two groups, the one must either be similar to or richer or poorer than the other; other cases than these three never occur, and are therefore, as far as experience goes, impossible. These experiences are so very frequent and so common that we cannot imagine a world in which these simple laws of co-ordination do not hold. Accordingly we have not considered these laws as empirical laws, which they really are, but as *a priori* laws which inhere in the human mind before any experience, but which do not come into its consciousness until after it has encountered them through individual experience. We have no reason to hold longer this artificial construction, which has no real basis, but whose source is to be traced back to the half-forgotten religious conceptions regarding the act of creation and the endowment of man with certain characteristics on the occasion of that act.

With these considerations others may be connected by means of which one arrives at the idea of number by the comparison of groups and by the systematic construction of them out of single numbers. We see, then, that if we confine our observations to enumerable things, we arrive

at a corresponding science—arithmetic, or science of number. Some one may perhaps ask whether there really are any things at all which cannot be counted. Without doubt, an affirmative answer must be given to this question; for in our experience we have a number of parts which are variable without our being able to set the various single parts over and against each other. When, for example, we look at the sky at sunset, it has on the horizon the color of gold and gleams; as one looks toward the zenith, this gleaming phase of the sky passes by degrees through greenish tones over into the pure blue of the sky. In this case we are quite certain that the color of the sky at the horizon and at the zenith is different. We are not able, however, to designate numerically the number of the different colors of which the total variety consists, because a line of demarcation can nowhere be drawn between the ending of one color and the beginning of the next. Therefore all the continuous diversities that we experience elude enumeration, although they do not escape co-ordination; for, to retain this illustration, every special color in the whole wealth of color in this sky has its own special place, and we should easily notice it if we were to undertake to transfer the color as it appears at a height of thirty degrees, as a spot, to a height of sixty or seventy degrees above the horizon. There it would be completely different from its surroundings and would not merge continuously with them. Thus the succession of colors from the horizon to the zenith represents an ordered variety, not a multiplicity consisting of members which can be counted, but which, on the other hand, are connected from beginning to end by a constant relationship. This, of course, is not the place to enter upon a discussion of the systematic construction of this whole theory of multiplicity. From what has been said one gets a sufficiently clear picture of how, by the

inclusion of one idea after another, more and more elements come into connection, through whose alternate union and mutual effect an increasing variety of relationships or special conditions arise, the determination of which is the mission of science. In the relatively simple case of geometry it has already been shown by recent investigations that at least sixteen different and entirely independent concepts are united to render the multiplicity of geometric phenomena. And the theory of combinations shows us at once an immense number of combinations of second, third, fourth, up to the sixteenth order, between these ideas; and what a variety, therefore, must be produced by the whole of a science so simple as geometry! And if we include in addition the idea of time, we pass from geometry to kinematics, the theory of motion, which proves to be considerably more varied than geometry.

All these sciences may be included under the idea of order, and hence may be termed in an inclusive manner the sciences of order. As regards their relations to the science groups previously formed, the most important thing to be said is that the most general theory of order is identical with the discipline which, ever since Aristotle, has received the name of logic. Aristotelian logic, to be sure, is only a very small part of the theory of order—that part, namely, having to do with the inclusion and exclusion of groups corresponding to certain definitions. Modern symbolic logic, or logistic (*Logistik*), as it has also been called, represents a more scientific and universal conception of the problems before us, but it has not yet arrived at the most elementary analysis of their concepts. This is due to the fact that symbolic logic has been developed from the side of mathematics, which is a still more complicated science, in that one thing after another has been thought out from the elements of mathematical concepts as presuppositions. This process of ab-

straction has already been carried quite far, and we now have a corresponding science which has been developed in recent years to an encouraging degree in a variety of directions. But the ultimate deductions have not been systematically completed, so that an accurate working out of the thoughts just outlined here is still lacking, and this first-principle foundation for all other sciences, which from the very nature of the case is all-important, is yet to be constructed. Thus much, however, is already known: that logic still passes as a postulate for all other sciences. For, as we know, there is no single science that does not consider as at least one of its aims the bringing of all its thought material into logical relationship—*i.e.*, the subjection of it to the laws of logic, or to the general theory of order.

The disciplines called arithmetic, or theory of numbers, and algebra, or theory of quantities, are still more special cases. For the general hypothesis which is made in algebra, that things belonging thereto can be added to or subtracted from one another, and furthermore that as quantities they can be subjected to measurement, is itself a limitation, since, as we have seen, there are also things which cannot be added or measured, and hence cannot be subjected to the other algebraical operations.

In connection with this description of the most general of all the sciences, we are at once confronted with a fact which is absolutely fundamental for the entire superstructure of the sciences, and with which we must, therefore, become as thoroughly acquainted as possible. We have seen that the most general concept of a thing may be defined by saying that that thing may be differentiated from all other things. This characteristic of differentiability is evidently a characteristic which is presupposed in any scientific problem. Whether we are examining chemical substances or search-

ing for the natural laws having to do with agriculture, we must always be able to differentiate the objects with which we are busying ourselves in order to be able to talk at all sensibly about them and to determine their natural laws. In other words, this means that those elements of an idea which we have found occurring as the *most general* ones we also encounter anew, owing to this very characteristic of universality, in connection with all the special ideas which we meet in any way or place in the more *special* departments of science. The most general sciences, therefore, will inform us concerning relationships which are not confined to these sciences themselves, but are found in all other sciences which arise through specialization from the more general applied ideas,—which treat ideas, therefore, that contain more constituent parts and more diversified ones than the ideas of the more general sciences.

The fact has already been emphasized that logic, for example, is a criterion for all the other sciences, and that its laws must be fulfilled before there can be any question of special laws in the other sciences. We also find that the quantity characteristics and the intensive variations parallel thereto that have no quantity characteristics occur in all the other sciences. Whether we have under consideration sociological or physical problems, we endeavor in each and every case to apply number and measure to them, and we think that we have made unusual progress in these sciences if we have succeeded in applying more general principles and methods of this kind. In the same way we apply to geometry the ideas which we have developed in arithmetic and algebra, and kinematics in its turn presupposes again all the ideas and relationships of geometry in order to be able to express thereupon its special laws.

Here, then, we have a natural law for the formation of

all the sciences. *The more general ideas and laws enter as regular component parts into all higher or more special sciences*, and there is no possibility at all of making any sort of scientific assertion in these more special or higher departments if the hypotheses are not fulfilled which the laws of the lower or more general sciences demand. We shall, therefore, be able to say that every higher science is divided into as many separate divisions as there are lower sciences to be found below it. The most complicated and highest of the sciences that we have considered—kinematics—will, therefore, have its algebraical and arithmetical and finally its logical side, for all the laws of the sciences just mentioned are already presupposed before one is able to set up the special kinematical laws. Hence, to express the matter in a purely scientific and technical manner, the variety of science, or the number of headings into which it falls, must become greater and greater the higher we ascend the pyramid of the sciences. This point of view will be of decisive importance to us, especially in connection with the later, more complicated sciences, in dividing and reviewing them.

We turn now to the second group of pure sciences, which treats of ideas that are lesser in range, but, on the other hand, are more diversified in content, than the ideas that have been richest in content heretofore, and which have been employed in the field of the sciences of order which we have just completed. These more diversified concepts are *space* and *time*, and it will be well, perhaps, to convince ourselves that both ideas are already of a very complex nature. We are accustomed to think of space in the following manner: we know that it has three dimensions, each independent of the other; that it therefore represents a threefold manifoldness; that it is in other ways continuous and without direction—*i.e.*, that it is alike in all directions. It is to a less

degree a matter of common knowledge that time represents a complex of quite a number of ideas. One can soon convince himself, however, that it certainly is not of an elementary nature, for it shares with space the characteristic of continuity; it is not, however, of three dimensions, but of one dimension—*i.e.*, in other words, one can pass from one point of time to another only in one way, and not, as in the case of space, in a threefold infinitude of different optional ways. Moreover, there belongs to time a characteristic which we do not encounter in connection with space, namely, the lack of symmetry. We differentiate the past from the future with absolute certainty, while in space it is entirely arbitrary what direction we call forward and back, or up and down, so long as we leave out of consideration other relationships not having to do with space. Moreover, time has the characteristic that, in spite of its one-dimensional nature, it never overlaps itself, there is never a point of time that belongs at the same time to an earlier or later time. These are all characteristics which can be expressed only with the help of simpler ideas, and which, therefore, make one realize how very composite and complex an idea is, taken in such a form from our experience.

In this connection we can only mention in a few words the fact that by means of the latest developments in physics, especially through certain optical experiments, science has been able to subject the ideas of space and time to a revision which has led to a peculiar synthesis. According to these developments, the details of which cannot be elaborated here, space and time are not to be thought of at all independently of each other; but, on the contrary, terrestrial occurrences are represented by a four-dimensional multiplicity, three dimensions of which belong to what has heretofore been called space and one to time. These dimensions, however,

are not mutually independent, for the definition of time in various places and that of space at various times condition each other in a special way. This points to a weighty general point of view, with which we shall soon be intimately confronted. We may ask ourselves whether the simple ideas upon which we gradually build up our system of ideas are of such a nature that each newly added idea comes as an additional degree of *higher* order to those which have been treated and employed previously. In that case there would exist among the various simple ideas a definite hierarchy, according to which, in the first place, are employed for the construction of a scientific system those general conceptions which have the most universal character, and then, of the other ideas, those which follow each other in this hierarchy should by degrees be sought out and employed for the construction. Up to the present this question has not been subjected to a close examination, and the possible answers thereto can therefore only be touched upon. It appears from what one has been able to see heretofore that a double relationship obtains. Single conceptions actually are built up one above the other in this hierarchical manner. This we see from the fact that after examining the question from all sides, there is indeed but one single definite sequence of sciences that permits of arrangement one above the other according to these principles. From this we must conclude that the new conceptions appearing in connection with the higher or more special sciences are of such a nature that they can appear only at this point, and, on the other hand, can play no rôle in the sphere of more general concept-building. On the contrary, we observe (and the relationship of space and time just described affords us an example of this) that when we arrive at a certain stratum of science formation it is not one single newly added conception which determines the

new science, but several. In this case, then, it would be the ideas of space and time which, since they are not independent of each other, cannot occur as steps one after the other independently of each other, but determine simultaneously the new stratum of thought and science.

In the observations which we shall now have to make regarding the sciences next in rank—the energetical—we shall find a similar case. The various types of energy appear as absolutely parallel conceptions which have no natural gradation as regards each other,—at least, none has been recognized and proved beyond possible question,—and which may be used, therefore, beside one another in whatever sequence one pleases. By their application to the classification of the sciences there result a number of special sciences, which are to be arranged one beside the other, but not one over another. With these hints, I must let the matter rest here, and only state in general that investigations like the above have not as yet been carried out in science from sufficiently general standpoints, so that it is frequently new territory, not yet investigated or worked, which must be entered. The uncertainty naturally belonging to such soil is lessened owing to the fact that we have already come to an understanding concerning the more general principles according to which the investigation is to be carried on. Therefore each single case that has not yet been more thoroughly examined may be clearly and definitely determined, thanks to these principles.

We now turn to the second great stratum of the sciences. The first we called the sciences of order, after their all-important, determining central idea, and the second we shall call the *energetical sciences*, because in this case the idea of energy is shown to be as general and determining as was order in the sciences mentioned heretofore. The sciences

which we shall discuss here are also called the physical or inorganic sciences; according to traditional division, they consist of mechanics, physics, and chemistry, and have to do with far more complex ideas than those with which the sciences of order had to deal. Within the sciences of order a cube is determined, so far as geometry is concerned, by the length of an edge; for the geometer there are not two or more different cubes, the measurement of whose sides is one centimeter. In physics, on the other hand, such a cube may turn out in a great variety of states: it may be different in density, in color, in temperature, in electric activity, etc., etc. Still greater variety occurs in connection with this idea in chemistry, where the cube may be formed not only out of more than a hundred thousand different chemical substances, but also out of an infinity of solutions and compounds made from them, and therefore it appears to the chemist each time as a different object.

We have already designated energy as the central idea within this sphere. This means that one can express all the variations of which we have just spoken within the whole sphere of physical sciences by certain statements regarding their ratio of energy. Since it is here a question of a relatively new thought formation which stood in a certain antithesis to those hitherto encountered, a few words concerning this matter are necessary. The field of the phenomena which have just been characterized is more commonly termed at present the field of material phenomena, or of phenomena occurring in matter, in which connection we understand matter to be the foundation, or what is permanent in the diversity, of physical phenomena. A general characteristic of concept formation has made itself felt in this connection, which we can also show, even if not quite as clearly, in the ideas of the sciences of order, but which is especially fa-

miliar to us in the field of which we are at present to treat. This is the idea of substance. We have already seen that our mental attainment is characterized essentially by the ability to remember, through the circumstance that the recurrence of an event affects us differently from its first occurrence. Owing to the function of memory, those which are repeated are endowed with the characteristic of familiarity, and thus, when we encounter new experiences of so well known character, we are placed in a position to feel at home or at ease with them; that is, the different component parts of the experiences are expected and presupposed by us, because we have impressed their connection upon our minds by the function of memory. Things which always recur together as regards space, such as are represented by the ideas of "apple" or "stone" or "tree," we are accustomed to consider as belonging together, and to call with special emphasis "objects" or "substances." Here it is a question of such formations as show a quality of stability; and therefore each time that we come in contact with them, a school of philosophy which denies so-called reality,—*i.e.*, the existence of things independent of ourselves,—owing to the circumstance that we can experience such things only in our consciousness, thinks itself justified in drawing the conclusion that these things exist only in our consciousness. I shall not occupy myself with a refutation of this opinion, but merely call attention to the fact that no one of the philosophers who share this opinion arranges his practical life correspondingly. Each of them, like the rest of mankind, actually demeans himself as a realist as regards the facts of life—*i.e.*, he recognizes in his practical attitude toward them that they have an independent existence in no wise influenced by his consciousness, and confines this spiritualistic theory of existence to his books and lectures. And there, too, we may

leave them, because it is my intention to deal only with realities—*i.e.*, with such things as have practical results, and especially with such as enable us to foretell the future with certainty.

The ideas of such substances are formed, as we have seen, automatically from our experiences through the function of memory. Our whole language, in its nouns, is full of the names of such substances, in which, however, the characteristic of stability changes within various limits. We encounter every possible and imaginable degree of stability, from things which exist only for a moment, but recur often with the same characteristics,—for example, lightning,—to things in which, within the memory of man, no lasting changeableness has ever been shown,—for example, sun and moon,—and therefore we always guard ourselves very carefully from connecting with the idea of a substance, or of a real thing, any kind of postulate concerning its “absolute” permanence. We can, of course, say to ourselves that substances in connection with which there can be shown a very high, or, so far as our memory serves us, even an absolute degree of invariability, will evidently play a predominantly important rôle in the formation of concepts. So we see that in the entire province of physical sciences mankind has continually sought for ideas by which such substances may be represented. And the whole thought of the period of scientific development which terminated with the middle of the last century rests essentially upon the fact that a concept of substance which had been developed up to that time—that of matter—was considered the most general and lasting. This idea of matter was formed quite rationally in the eighteenth century, men having co-ordinated with each related group of physical phenomena, determined by their similarity, a form of “matter” appertaining thereto. So there was, by the side

of the heavy, massive matter of ponderable substances, also matter in the form of warmth, of light, of electricity, of magnetism; and each of these terms serves to designate the existence of a definite kind of essence, or substance, to which a certain measure of durability and constancy has been attributed experimentally. Then, however, a certain degree of hesitancy regarding the completely ideal durability of many of these substances began to make itself felt. One can produce electric matter by rubbing glass and rosin; magnetic matter may be increased arbitrarily by rubbing unmagnetic steel rods; and in the same way one sees matter in the form of warmth arise in fire and disappear by absorption. We are confronted here by a twofold possibility: either one may extend the idea of matter in such a way that we may also include in it this process of appearance and disappearance, or we may limit the idea of matter to those things that we have experienced in which we are unable to show appearance or disappearance. Science has chosen the second route, and all imponderable forms of matter in which a process of appearing and disappearing can everywhere be shown have been eliminated from science. During the whole of the nineteenth century, since the time when Lavoisier proved—or, rather, since the publication of the postulate first promulgated by Lavoisier—that the sum of weighable substance remains constant under all circumstances, the idea of matter has been confined merely to these ponderable substances. By this process every other form of matter came into a false position, so that one did not know how to classify these entities, which, however, had not given up their rôle in either pure or technical science. One finally got around the difficulty by deciding to consider them hypothetically as motions. This, however, has not been carried out consistently. Until toward the end of the nineteenth century one read not infre-

quently of electric "fluidum," even though the expression electric "fluid" was avoided on account of a sort of linguistic feeling of embarrassment.

This un-coördinated and, so far as system is concerned, insufficient character of science has been fundamentally obviated by the discovery of the law of the conservation of energy. In his fundamental work, Julius Robert Mayer, the first discoverer of this law, undertook the single, definite task of finding by the side of weighable matter (whose constancy in all transformations, so far as weight and mass are concerned, had been fully confirmed by the physical and chemical investigations that had been made in the meantime) still another similar substance or matter which would include the imponderable part of natural realities. Mayer called these things *forces*, and hence sought, as he expressed it, to find a law which permitted of attributing to these forces that kind of uncreatability and indestructibility that had been noted in matter. His investigations at first led him into error. After he discovered that by the employment of mechanical action warmth was created, and, on the other hand, that in heat machines mechanical action can be attained through the employment of heat, he sought long in a wrong direction for the mechanical expression which could be proved equivalent to heat. Only after having endeavored in vain to provide the mechanical quantities, as he encountered them in text-books of physics as the measure of force, with this characteristic of uncreatability and indestructibility, did he finally arrive at the conclusion that the desired characteristic of mechanical *work* is due to the product of force and distance. With this discovery he revived an idea already expressed with utmost assurance and definiteness by Leibnitz upon a basis of purely mechanical considerations. Leibnitz had already shown that in the course of the mani-

fold changes of mechanical agencies into each other there always remains finally, in like constellation, in the ideal limiting-case, that which he called living force, the quantity which we now term *kinetic* or *motive energy*. Mayer's addition is the clear recognition of that which had found only short and rather hypothetical mention at the hands of Leibnitz, that in all cases where this law of conservation does not hold, another form of *force* (as Mayer called it), *energy* (as we call it), has taken the place of mechanical work or natural power, and this other form is, in general, *heat*. In the meantime Mayer extended this idea to all other forms of energy known at that time. We are indebted to him for the view that in addition to ponderable matter there was another sort of substance, an unweighable substance, which he called power, and which, like weighable matter, possesses the property of remaining quantitatively unchanged, whatever be the qualitative changes that it undergoes.

It is a well-known fact that this idea was arrived at independently by Joule, Helmholtz, and a few other investigators, and was further developed by them, and that down to the present it has led to the most definite and far-reaching theory concerning all physical phenomena that science has ever possessed. We now know that all physical phenomena, inclusive of chemistry, may be quite sufficiently and accurately defined and characterized as transformations of energy; so that, given the kind and amounts of the forms of energy that disappear and those that arise, every physical event is sufficiently characterized.

We thus see that the idea of substance, which was decisive for the origin of conceptions within the sphere of physical phenomena, assumed its most accurate and all-important form in the idea of energy. And it only remains to call attention in a few words to the fact that in this regard

energy has a more real meaning than ponderable matter, which had been looked upon from a physical point of view as the essential part of all phenomena. For the most recent development of physics has brought us to the point of view that mass can no longer be considered as something that is unchangeable under all circumstances, and that under present conditions we can no longer consider as absolutely correct either the fundamental mechanical law concerning the conservation of mass, or the law, regarded as equally fundamental, concerning the conservation of the quantity of motion or of the center of gravity. It is true of the greatest part of the phenomena of which we know. In a certain number of phenomena, on the other hand,—those, namely, in which radiation occurs as an energetical element,—further and more general formulation is necessary, and with its development science is now engaged. The history of this matter comes to a focus, however, in the fact that energy, as a matter of course, must be recognized in general and in particular as a substance. For, although in this last-mentioned great change in physics all other laws of conservation, and hence all other previous ideas of substance, have experienced upheavals and interruptions, no one has yet dared, even in the course of the most far-reaching speculations, to doubt the law of the conservation of energy. This is not due to any sentimental reasons; for the law regarding the conservation of energy is not much over half a century old, and therefore has by no means become such an almost ineradicable element of our mentality as had formerly been the case with the fundamental laws of mechanics at the hands of scientific people. The cause is, rather, that while those other substances, especially weight, mass, and the similar quantities that we have mentioned, extend their significance over quite a considerable proportion of science,—but

not, however, over the whole range of phenomena coming here into consideration,—energy, on the other hand, is the absolutely universal idea which finds its application in every physical phenomenon,—yes, as we have seen, in connection with every occurrence in general. To question the accuracy of the law of the conservation of energy would mean in fact to bring about a much more far-reaching upheaval in our previous methods of thought than to discuss the changeability of quantity (shown according to newest theories to be dependent on its rapidity) and other more circumscribed questions.

Now this is the reason why we in general term the great new field of science, which has been opened by specializing the previous more general ideas, the field of the *energetical sciences*. In regard to energy we know that it is a quantity taking part in all the phenomena of the entire field, and which, as regards all these phenomena, is subject to the law that to disappearing amounts of any forms of energy there always correspond like amounts of other forms of energy which arise simultaneously, so that the sum of all forms of energy remains constant. The question, then, how can one measure these various forms of energy so that their sum may be arrived at, may be answered by saying that it has been agreed upon to regard as equal those amounts of energy which arise from an amount of definite form of energy taken as unit (*motor energy* has been chosen for this purpose), or which change into this unit. This looks very much like a *petitio principii*, for if we call the amounts arising from the transformation alike, then the sum of the amounts of energy so measured must naturally be constant under all transformations. However, it is here a question not only of a formal determination of this kind, but of an actual natural law which arises from the following considera-

tion. Given three forms of energy, A , B , and C , assume that we next change the unit amount of A into B and define the amount obtained thereby as the unit of energy B . We then transform this unit into the third form C , and again define the amount thus got as the unit of the form of energy C . We can, in the third place, however, transform the unit amount from A , instead of passing by way of B , directly into the unit amount C , and the empirical law which thus comes to light reads that one gets in this direct way exactly the same amount of the energy C as one would have got through both steps from A to B and from B to C . If one adds still a fourth form of energy, D , there are not merely two different ways, but six of them, in which one may transform the unit amount A into the amount D ; and experience also shows in this case that one always gets the same amount D from the unit A in whatsoever way the transformation may be undertaken. Hence can be formulated the general natural law that the amounts of any kind of energy that are got from any other kind are not only determined by this first and last form, but show themselves to be in no wise dependent on the intermediate forms nor on the multiplicity of ways in which the transformation results. This is the real content of the law of conservation of energy, and this content finds its shortest expression when one attributes to each form of energy its value in the way described in reference to the unit of an amount of energy taken as normal, and calculates with this value as with real quantities which can be added and divided without losing any part of their value on account of the manner of their arrangement or origin.

It is not necessary for the general observations which we have undertaken here to consider the different forms of energy which exist. It will be well, perhaps, only to say that the old division of physics into mechanics, acoustics, optics,

electricity, and heat can no longer be considered as logical. In the first place, acoustics is a part of mechanics, as has long been known, even though, of course, thermic phenomena do not play an unimportant rôle in it; then, on the other hand, optical phenomena have been recognized as a part of electromagnetic effects at a distance, and the most recent developments of this science even make mechanics appear as a part of electromagnetism, while at the same time a new electric theory of chemical action, at least in its initial phase, has been noticed. It would, therefore, appear at present as if we should be able to trace all other forms of energy back to electric—or, more exactly expressed, to electromagnetic—energy. However, development in this sense is only just in its most elementary stage, and therefore it cannot yet be stated with a sufficient degree of certainty whether the way that has just been pointed out, that would also conduce to the inward unity of the various forms of energy, can really be followed to the end. It is not impossible that the position of the electric theory of all physical phenomena in the course of half a century or so will be similar to that of the mechanical theory of all physical phenomena at present, namely, that it will demonstrate itself ultimately as unfeasible.

Finally, we should not fail to mention just here that the various forms of energy are not to be looked upon as ideas placed in a higher order, but rather as collateral, new, complex ideas in this field. For this can be assigned only the partial reason that the forms of energy that have been traditionally taken together in physics show a closer relationship to each other than to chemical energy, which, owing to the excessive variety of its phenomena, has for several centuries developed as a special science as compared with physical phenomena, and shows also certain fundamental new variations. Whereas, for example, it is a matter of indiffer-

ence in electrostatics whether a conductor of any definite form—for instance, in the form of a ball which is a meter in diameter—be made of tin or gold, of iron or lead (for electrostatic capacity depends only upon the form and environment of the conductor, not upon its special nature), for the chemist the various balls just mentioned are absolutely different objects, and in his eyes are endowed with the characteristics of mutual untransformability and lasting difference. For as regards chemistry before the present time, the law of the conservation of elements has been as valid as the law of the conservation of volume is for mechanics. But the same investigations that cause the law regarding the conservation of volume to be viewed only from what must be admitted frequently as a complicated special case of a general law, have also led us to view the law of the conservation of elements as a very general law whose conditions, so far as the occurrences known down to a decade ago were concerned, had always been fulfilled, while the facts which have been observed recently in connection with radioactive substances lead to the establishment of exceptions to this law. We are, therefore, led to conclude that there are some more general laws, as special cases of which these particular laws of conservation appear, which, however, under certain conditions and hypotheses, also permit a non-conservation, possibly a mutual transformation, of such quasi-substantial qualities.

If we now undertake to prove the proposition just laid down, that the laws of the more general sciences everywhere and in every detail must be true of the laws of the higher and more special sciences, we are able to convince ourselves readily that it must be so throughout. That we cannot treat of all the physical and energetical sciences without logic is a statement which is so trivial that one almost hesitates to

express it; however, it must be mentioned here for the sake of completeness, and also for the reason that the position of logic as the most general of all sciences—more general, in fact, than mathematics—is by no means commonly known and recognized, although for a decade I have pleaded for this point of view, which is so fundamental as far as method is concerned. It is also just as much a matter of common knowledge with us that we have to apply mathematics and geometry, and finally kinematics, to all the phenomena of energetical happenings. It is well known to every one acquainted with the history of these sciences, that especially the introduction of mathematical and geometrical methods into the treatment of physical phenomena has brought with it enormous progress in our comprehension and treatment of them. Does not quite an appreciable proportion of our highly developed technical knowledge of to-day rest upon the fact that we have learned to apply number and measure to the various physical phenomena, and hence to foresee the results of certain constructions and combinations, so that they may be exactly determined, not only in respect to kind, but also as regards amount? The construction of all modern machinery rests in fact, as we have seen, upon a knowledge of mechanics and thermodynamics. Electrotechnics, too, which has begun to transform our outward life so successfully, and whose influence upon this transformation is by no means terminated as yet, has been completely developed upon a mathematical-geometrical basis laid so successfully and deeply by the geniuses of electrical theory, from Ohm through Faraday and Maxwell to Hertz and the investigators of to-day. In this very department of the physical sciences, more clearly than in any other province of knowledge, is shown the extraordinary assistance that the systematic introduction of the earlier and more general sciences

has brought with it into the investigation of the higher and more special sciences. As a most impressive example of recent times physical chemistry may be mentioned, which also rests upon this kind of application of the more general mathematical and physical concept formations to the phenomena of chemistry, through the operation of which problems have been solved in a few years which the usual method of investigation in vogue up to that time, that clung more to the immediate phenomenon and took no consideration of any further means of assistance, could not have touched in a hundred years.

We have now noted what is most essential regarding this second stratum of the sciences, and we have yet to call attention to the fact that the variety in this field may easily be surveyed synthetically by means of conjoining the various kinds of energy. Within the range of all the physical sciences the legitimacy of each single kind of energy must first be established. Then each one of these kinds of energy must be combined binarily with each of the others, whereby new localities result from their reciprocal action. Thus, for example, the characteristics of vapors have been investigated, on the one hand, by the theory of heat; and, on the other hand, one could apply to them the mechanical laws studied in gases. By means of the combination of the laws of mechanics and heat thermodynamics arose, the science which has taught us the nature of the agent so important to steam-engines, upon which the whole enormous development of the corresponding technical science of the present rests. To the binary combinations of two forms of energy the ternary must be added, and so forth, until all the combinations possible have been exhaustively worked over. By means of this seemingly outward manipulation, but one which is in fact fundamentally scientific, not only a complete

diagram of all the possible and conceivable disciplines of physical science can be constructed, but one may even predict to a considerable extent what forms the special laws will assume in the various columns of this table. Moreover, a diagram of this kind makes possible the immediate drawing of conclusions in case a form of energy is discovered which has not been previously observed. One has to bring this new kind of energy, X , as a new member into the whole calculation or combination with the pre-existing kinds of energy, and to form again as a consequence, after having determined their laws by the combination of X with the energies A , B , C , etc., a group of binary, and later, as has been described, a group of ternary and of more highly complicated fields, by working through which one may be certain of exhausting methodically all the physical disciplines that permit of survey down to that moment. Such a situation is so highly desirable and valuable that under all circumstances we should do everything possible lying within the range of science to attain to it.

An especially instructive example of this scientific process of extension by means of the inclusion of the ideas already derived from the earlier and more general sciences is presented by the most recent development of chemistry in respect also to the application of the ideas of time and space to special chemical problems. The incorporation of the time idea in chemical phenomena led to the great field of *chemical kinetics*, which has borne fruits so abundant, and in which, in spite of the short duration of its previous scientific existence, progress so noteworthy has been made, both from a theoretical and from a technical standpoint. It need only be mentioned that it was in this field alone that the phenomenon of catalysis, which had been known for a century, was able to attain a logical explanation. As to the

application of the idea of space to chemical phenomena, we need only mention stereochemistry, which at the present time also represents a science that has arisen only in the last decade, but which already has a wide range of application, and in which the idea of the multiplicity of space has been successfully applied for clearing up chemical diversities, especially isometrical relationships. Here, too, it has been possible, by carrying out logically the basic idea, to make a great number of chemical prophecies which later experimental investigation has confirmed down to the smallest details.

We now turn to the last group of sciences, whose ideas are the most complicated and therefore the smallest in scope but richest in content. This group arises from the fact that to the ideas that we have thus far arrived at in the field of order and energy, that of life is added. By phenomena of life we understand very definite transformations of energy by virtue of which the objects in question—the living beings—accomplish a continuous transformation of free energy, consumed either in the form of chemical food, as in the case of animals, or in the form of the radioactive energy of the sun, as in the case of plants. Over and above this continuous or stationary transformation of energy they are distinguished, moreover, by the capacity for reproduction—*i.e.*, the production of new similar types, by means of which individual mortality of single members has been transformed through time and space into a disproportionately longer continuation of the *species*, the totality of similar individuals. Thus in connection with the scientific examination of life we have to presuppose for its ideological comprehension and definition the totality of the sciences of order and the entirety of the physicochemical or energetical sciences. In so far, therefore, we shall have to say that every living being is an

energetical type, and that all the laws that we have found for such a being must find their legitimate application to living beings. We shall have to say, furthermore, that a new conception has appeared here,—that of life,—which is characterized by stationary transformation of energy as well as by the capacity of reproduction, and concerning which we cannot maintain that it can be completely defined by general physicochemical laws. For we are quite in a position to differentiate experimentally living beings from those without life, and this fact alone suffices to prove that new relationships have appeared in connection with this narrow group of things, the ideological comprehension of which gives the scientific definition of life. Hence we shall have to consider every living being as a physicochemical object, in so far as nothing can occur in this object that does not take place within the compass of the energetical laws. But we shall have to consider animals as formations of a special kind in so far as certain peculiarities belong to them which are by no means present in all energetical objects, and which, therefore, render necessary special treatment and scientific discussion of them.

The science of living beings we term in general *biology*, and we divide this whole discipline into single groups according to the special kind of life activity, and, at the same time, according to the increasing intricacy of the entire organization of the living being. The most general characteristics and relationships which occur in all living beings, and take on a one-sided and specific development only in the case of certain ones, according to special forms and purposes, we treat in the form of a whole science bearing the name of *physiology*. In the very first place, it is a question here of physicochemical conformity to law. The special characteristic of physicochemical happening in the living being must be shown here

in detail and explained experimentally; and, inversely, the physicochemical hypotheses must be found regarding the activity of all specific happenings in living beings, their single functions. Thus the principles of division which were determining for the energetical sciences make themselves felt also as secondary reasons for division in physiology, and the corresponding groups have also been formed already in this science, such as electrophysiology, mechanical physiology, chemical physiology, etc.

A special apparatus in connection with which new kinds of phenomena arise, which have led, therefore, to new formations of concepts, is not found in all living beings, but only in those in which a division of functions has taken place, and hence in which the necessity exists for uniting these divided functions for the purpose of harmonious and suitable working. This is the nervous system, which in the case of the more highly developed animals is grouped about a central organ which, as we ascend the scale, is formed in a more and more complicated and abundant way, until it reaches its highest development in man. The special relations that occur in the function of this central organ are what form the subject of this higher and more special science of life, which, from the name for the totality of this function in man, we call *psychology*. Here, also, we shall have the same things to say about general biology, namely, that for the investigation of psychological relationships in lower and in higher living beings, finally in man, the knowledge and efficacy of physicochemical as well as of general biological laws must in all cases be presupposed, and that here it is only a question of specializing the mode of operation of these laws according to the special conditions under which, in the first place, nervous phenomena—in a narrower sense, psychic phenomena—occur. Since these psychic phenomena also presup-

pose energetical happenings, even occurrences in connection with ponderable substances which are endowed with chemical energy, we must consider them of course as energetical occurrences, and the old problem of the connection between mind and matter attains a satisfying systematic solution in the light of the general system of science here described. Psychic phenomena, in the next place, must be considered as resting upon a definite energetical basis. Within this limit, however, they are specialized by peculiarities connected with the function of the nerve tracks and central organs.

Finally, an uppermost layer of this pyramid of sciences is formed by those facts and relationships which have developed in *man*, in contradistinction to all other animals, and which form that which we specifically call human *civilization*. This science is usually designated by the improper name of *sociology*. The name is due to the fact that man, even in the very early stages of his development, has unquestionably been a social being, so that, for much the greater part, specifically human culture has shown itself to be the culture of groups of people living together socially and busy-ing themselves in common. This special nature of human culture, however, is relatively a secondary phenomenon; and it is, moreover, not entirely general, for certain cultural performances have been, and can in the future be, accomplished by a single individual. Thus, socializing mankind is an important phenomenon in this field; indeed, it is one of the most important, but not the characteristic and universal one. I proposed, therefore, a long while ago to call the field in question the science of civilization, or culturology (*Kulturologie*). And though it is not my opinion that anything of very great importance for science depends upon the acceptance or refusal of this proposal, I think, nevertheless, that in the present indefinite situation in which the science of civili-

zation, or sociology, finds itself as regards its general principles and its place within the field of the other sciences as compared with the generality of them, a sharper emphasis of this kind on the essential feature of this new science might be of some benefit.

To culturology, or the science of civilization, numerous sciences belong which we are accustomed to include under the name of *mental sciences*, the retrocedent nature of which, to express it in terms of method, we have already discussed and explained above. Law and language, administration and agriculture, industry and science, religion and art, are all merely different forms of activity proper to the general cultural work of humanity. Any investigation of them must, therefore, take the direction of applying the laws of the corresponding occurrences from what the historical knowledge of earlier phases and the anthropological examination of contemporaneous phases of less developed peoples and of other groups of human culture has placed at our disposal, in order to determine thereby the present *niveau* of a given field of culture and its prospective development. What we call politics in its wider sense, not only the relations of one state to another, but the general technique of the administration of common possessions and the education of coming generations for the corresponding activities of the community,—this wider kind of politics, including the politics of civilization, shows itself under this aspect to be the field of application for scientific culturology or sociology; and, speaking ideally, through the development of this latter science in the future politics should be formed and conducted with the same certainty and precision with which we build at present an iron bridge or a station and understand how to direct an electrical or steam plant of so many thousand horsepower and keep it going.

Culturology, appearing thus as the topmost course of the pyramid of the sciences, shows itself from the point of view of method also to be the most diverse and many-sided of the sciences. For all of the more general sciences, logic, mathematics, geometry, and kinematics, as well as all the energetical sciences, and finally general physiology and psychology, have each its influence upon the formation of culturological ideas. A sure mastery of at least the fundamental principles of all the sciences that I have just mentioned is therefore a necessary presupposition for the scientific mastery of culturological problems. If one considers that science of the twentieth century, even, is far from enjoying a sufficient development of them, especially of the biological sciences, and that the application of the sciences of order to cultural science has already made some progress (especially in the sphere of political economy and in its technical application—statistics), one realizes that the application of the energetical sciences to the science of culture has almost been mapped out provisorily in its fundamentals. Still less can there be any question of a rational general application of biological theories to the science of culture, in spite of the fact that tentative efforts in that direction have already been made.

Thus one sees with what an enormous problem we are confronted, one that is scarcely to be compassed with our present resources; and it is quite comprehensible if the workings of previous mental sciences, which have not been able to await the systematic development of concept formation in the lower sciences that are so necessary for any rational treatment, leave so very much to be desired at the present time on the side of scientific method. In the field of culturology it is still almost universally a question of the technical period of science, for nearly all of the special cul-

turological sciences are at present only in the stage of their own development determined by practical necessity. In this connection, I need only remind you of the present condition of jurisprudence, which shows precisely the characteristic forms of development which have been outlined here. Mankind has not been able to wait until the twenty-first or twenty-second century, at which time it will perhaps be in possession of a pure or methodic culturology, to bring its affairs to such order that it might keep the body politic alive and capable of functioning. In the very same way, mankind has not been able to await the development of physiological chemistry in order to procure and prepare the food inevitably demanded day by day in order to preserve life. Thus, jurisprudence of the present is nothing but a most unsystematic sum of all previous attempts made by especially endowed empiricists to preserve the social and scientific order of a community of persons. The idea is very far from the mind of the jurists of the present, that all the problems relating to jurisprudence must first be illuminated with the fundamental principles of the physical or energetical sciences in order to place it upon an exact basis. If, however, one considers, for example, how exceedingly irrational our present criminal laws and penological procedure are, based almost entirely upon imprisonment, how by this process society is neither freed permanently from the evil-doer, nor is the latter placed under conditions in which he gives up as far as possible his anti-social habits and replaces them with social ones, one realizes what an enormous amount of work yet remains to be done in this field before we shall be able to speak of a real, scientific theory of law.

The same thing can be said of *language*, which represents the most important social means of communication, and whose duty it is to render the mental concepts of individual

persons accessible to other members of society, and then, by means of written characters, to insure their effectiveness for posterity over and beyond the life of their creator. This conception of language as a means of communication, and the criticism of language resulting therefrom, according to the standpoint of its *technical* adaptability to the exact, unequivocal, and sufficiently complete expression of the ideas formed by each individual, as well as to the transference of ideas from one individual to others,—this conception of language, I say, does not yet play the slightest rôle in the science of language. Instead of properly envisaging what is essential in phenomena of this kind,—the ideas, their co-ordination and system,—and making them the subject of scientific work, linguistics had heretofore limited itself almost exclusively to the most unimportant and least necessary of the whole phenomenon, namely, to the forms, in sounds and characters, which have been co-ordinated with the preconceived ideas. The extraordinary diversity of the various languages certainly shows clearly how very unimportant the special forms employed by single groups of people are for what is essential in language—social intercourse. Nevertheless, what has heretofore been called linguistic science confines itself almost entirely to the investigation of the nature, or at most to the investigation of the slow changes which these accidentally co-ordinated characters have undergone; while practically no attention at all has been given to an investigation of concept formation, to a system of the ideas themselves, to the question as to what classes of ideas there are, in what way simple and compound concepts react upon one another when combined—in a word, to the problem of the science of concept formation. So we need not be surprised that the fact is known to but few people that at the present time the technical problem of an artificial lan-

guage which is more complete than any natural one has already been solved. It is of special interest to note that the possibility of such a thing is most emphatically denied by the representatives of previous pseudolinguistic science, the philologists, though facts for years have proved the contrary.

If we glance back over the observations thus far made, we become aware that all of the sciences, taken together, represent an absolutely coherent complex, ascending from the simplest to the most involved, but exhibiting at every point the same course and the same character of progress, and consequently give no occasion at all for any delimitation of the frontiers of opposing fields as regards one another. It is therefore absolutely incorrect to separate, as is often done, the entire field of human sciences into two groups which have little or nothing to do with each other, and whose functions are fundamentally different. Regarding the group of the natural sciences there is complete agreement. Other sciences, however, which were formerly termed mental sciences, were set over against them. Afterward one necessarily became convinced that the natural sciences, too,—for example, psychology,—had to do with mind, and that mind, therefore, was no special distinctive mark of this other department of knowledge. Then it was thought that the science of civilization must be placed in contrast with natural science, but it soon became evident that cultural phenomena form a group (and indeed the highest) of natural phenomena. It is unreasonable and impracticable to consider the activity of man in his surroundings as “unnatural,” as compared with the activity of animals and plants. Finally, the sciences of this special group were called *sciences of volition*, because they rest upon the activity of the human will. This difference is not practicable, either, for without the

corresponding impulses of the will, which have been prompted by the exigencies of existence, no one would have busied himself either with the theoretical or with the applied sciences.

So there remains in fact no possibility of making an essential distinction, and only the historical difference exists that the treatment of the higher sciences heretofore has been largely carried on with inadequate means and without any information as to the real aim of all sciences, namely, the ability to predict. It is true that from this situation a contradiction has arisen which is destined, however, to disappear and will disappear all the more rapidly and all the more surely in proportion as the scientists in all the various fields become aware of the unalterable unity of all science. This unity of science leads us also to a great central problem, for the solution of which the representatives and incumbents of all the various sciences must co-operate.

This problem is to establish *a systematic inventory of all human ideas* upon the basis of the fundamental relations of increasing multiplicity and complexity that have just been explained in proportion to decrease in compass. Our preceding analysis of all knowledge has led us to see that some of these ideas, like those of order, of energy, and of life, stand out with especial clearness from the entire range of thought. But these ideas are all of a complex nature, and it is an inevitable necessity for the sure handling of the entire scheme of all the sciences that one should separate these very important collective ideas into their elements and arrange these elements in corresponding natural groups according to similarity and reciprocal efficiency.

This is a work the necessity of which was clearly recognized even by Leibnitz. We have from his pen numerous discussions of the extraordinary advantages which the hu-

man mind could derive from such an inventory of all its material for thought. But I am not aware that Leibnitz ever made the attempt to draw up a table of elementary concepts and to sketch, even schematically, the laws of their mutual effect in the formation of new ideas. I myself have been working on this problem for ten years, without, however, having made up to the present moment so extensive progress that I could give a consistent presentation of the entire matter.

In the course of these labors, however, certain points have been brought out as well as could be wished. There is, in the first place, the process of differentiating simple concepts from more complex ones. We recall the fundamental relationship between the content and the compass of the various ideas, and are enabled to establish upon it a means of defining the elementary notions. When we consider any idea and vary it, seeking out some nearly related one, the scope of this related idea will show itself to be either greater or smaller than that of the original idea. If it has become smaller, then the related idea is of a more complex nature than the original idea, and we have undertaken a synthesis instead of an analysis. If, on the other hand, its scope has become greater, we have simplified the idea, it has become more elementary. We can apply the same process to this simplified idea. If we finally reach an idea which cannot increase any more in scope by any form of change, we have arrived at an idea which may be regarded, at least provisionally, as elementary. Since it resists further analysis, it is entitled to a place in the table of elementary concepts.

This process, as one sees, is extraordinarily similar to the process of chemical analysis. In it, too, one proceeds by first subjecting a substance whose nature, whether it be elementary or compound, has not yet been established, to chem-

ical influences—*i.e.*, one endeavors to transform it into another substance with other characteristics. If a single second substance with increased weight arises from the substance submitted to us, and if, under all the conditions under which it is subjected to chemical transformations, some other sort of substance always arises whose weight is greater than that of the original substance, then we know that we have to do with an elementary substance. If, however, the substance can be transformed into others, each of which weighs less, or only one of which weighs less than the original substance, then we know that we have to do with a compound substance. If we subject the product of less weight thus arrived at to similar transforming influences, we can establish in its case also whether it is of an elementary or compound nature. In other words, under the supposition that a substance is compound, we treat it from every possible side with the agents by which chemical transformation is brought about, and observe whether it increases or decreases in weight, and if we have a substance which under all circumstances only increases in weight or keeps its weight unchanged, we have proved its elementary nature sufficiently well.

In this way the scientists who have chosen as their field of labor the investigation of the total problem of science will have to begin by examining all concepts as to their simple or compound nature, without any reference to any other relationships. From these results is, then, to be arranged a preliminary table of simple ideas which have been found thus purely empirically. These elementary ideas are to be pronounced elementary until their complexity is established, just as is the case with the elements in chemistry. According to the generally accepted definition, an element is really not an unanalyzable substance, but a substance which has not yet been reduced. In the same way we can say that an elemen-

tary idea is not an unanalyzable one, but an idea which has not yet been analyzed.

My previous work on the arrangement of a table of concept elements like this has shown me that these elements may be divided into two large groups of which passing mention was made earlier in our discussion. On the one hand we have the group of *substances* or *objects* or *things*, or whatever else we wish to call them, the group of those concepts which represent entities existing in themselves, which we always find recurring in the same way in the range of our experience, and which have, as regards time, an unchangeable or at least only slightly changeable nature. By the side of this group still another group of quite essential ideas is found, which we term ideas of *correlation* or of *relation* or of *reciprocal action*. They, too, represent quite definite experiences, but they refer regularly to two or more ideas of the first kind, and are the material by means of which the connection between isolated substances or things is brought about.

We realize at once that the psychophysical function of memory leads first to ideas of the first kind. Those elements of experience (since we are speaking here of elementary ideas) which always affect us in the same manner take on, then, the form of these substances or objects in our consciousness, and independently of ourselves assume this character of real existence which we ascribe to our external world. So long as mental functions are confined to the formation of such concepts of objects or substances, real thinking is impossible, since each of these concepts leads its own isolated existence and can in no wise come into connection with the others. Just here the experimental fact is added, that we never experience such concept elements in isolated form, but in coherent complexes which even as such

are felt to be units whose division into elementary component parts follows only by a considerable effort of the mind, for which a high degree of maturity and independence of judgment is necessary. This results from the fact of reciprocal connection, of the *relation* of substances to one another.

Thus these mental relations in the form of space or of time, or, to express it in general terms, of function, between the different concept elements of substantial nature, form quite an essential part of our total experience. The determination of such relationships between substances on the conceptual side has at least as much importance for our entire mental activity as the formation of the idea of the substance itself. The *association of ideas* which has been characterized and studied for a long time by psychologists is only a relatively narrow expression for this general function of relationship which is stamped upon our mind by the nature of its experiences. It represents, however, the best-known part of general ideas of relationship and permits us also to see the circumstances through which these relative ideas have been formed alongside of the ideas of substance. Such ideas of relationship, for example, are "by the side of" or "above" one another in space, "earlier" and "later" in time, and a number of others, all of which may be recognized by the fact that they never refer to a single object, but invariably bring two or more objects of different kinds into mutual relationship.

We recall from our preliminary description of all science that the idea of group, namely, the relation or connection between objects of like nature, appeared at the very beginning of our formation of ideas, and proved even then to be that process by means of which a mutual relationship arose from ideas of objects that until then had been disconnected, and with it also came the possibility of establishing natural

laws. The unconscious work of language, too, has clearly differentiated these two kinds of ideas: the object-ideas are characterized chiefly by nouns, but also by adjectives and other words, while the ideas of relationship are expressed chiefly by verbs. But since language, as has been mentioned, has arisen unconsciously—*i.e.*, without a clear consciousness of purpose or aim—the two great classes just referred to are by no means sharply distinguished from each other. For surely freedom in usage has given us on almost all occasions the possibility of making a verb of a noun, and, inversely, of considering in a formal way every verb as a substance-idea—*i.e.*, as a noun. But in such matters it is only a question of formal resemblance to the other group, whereas upon real analysis of the content of the idea connected with the words in question, their character as objects or as relationships can almost always be determined without difficulty.

Labors of this kind, which presuppose and demand quite a thorough knowledge of concept formation in all the sciences, represent now what I consider as the real rational task for a future philosophy, and one which will be useful—yes, indispensable—to mankind. According to this view, philosophy would be the science which is occupied with the sciences as a whole in reference to their mutual relations, their structure, and their circumstances. It has the practical mission, on the one hand, of predicting those fields of knowledge which have not been subjected as yet to any systematic treatment or to treatment of any kind, and, on the other hand, of rendering the existing fields of knowledge capable of easier advancement and better arrangement through the proof of systematic and methodical relationships to other sciences. By the cultivation of this new philosophy it will then be possible to organize and improve all functions of science which at present are so imperfect. The present procedure reminds

one of the growth of a primeval forest, where every single tree develops on its own account and by its own strength, as well as it can, and so far as it finds light and air. Under such circumstances splendid individual giants may grow, but only at the expense of numerous other trees which under other circumstances could have developed luxuriantly and beautifully, but which suffocate here under the shadow of the giant. Future science is more to be likened, therefore, to a logically cultivated forest in which every tree stands in its own place, and each, in proportion to its value, receives generous attention. To employ another figure, we still stand in our present attitude toward science as men stood toward the problem of economics when men were only huntsmen, and when the acquisition of prey, and hence of food, was essentially a matter of accident and of special personal skill. In our treatment of the sciences we wish to pass out of this primitive condition into a condition which may be compared to that of men occupied with agriculture, by cultivating regularly scientific progress. Owing to the fact that we prepare the ground suitably and arrange the conditions of development as favorably as possible, we shall gain, in the place of the accidental discoveries, which were at times quite abundant, but frequently extraordinarily scanty and insufficient, a steady harvest which, to be sure, is not entirely independent of the contingencies of external climatic conditions,—in the present case, of the multiplicity of political and economical conditions among men,—but which produces nevertheless, with slight variations, year in and year out, a regular, recurrent harvest and assures therefore a rational and careful collective science of humanity in this greatest and most important field of its entire mental activity.

An attentive reader has perhaps missed two things in this examination of all the sciences. First, a thorough considera-

tion of the applied sciences which are the mother earth out of which the general sciences have sprung. Furthermore, one may have noted the complete non-consideration of a discipline which is claiming at present an extraordinarily important place in our highest educational institutions, the universities, and the importance of which is being emphasized in a very lively way on many sides—namely, *history*.

As far as the first matter is concerned, it can be disposed of quickly and easily. One readily sees *that every applied discipline has its center of gravity in one of the general sciences*. Thus there is, for example, an exceedingly extensive and important applied science—astronomy. This had its center of gravity until half a century ago wholly in mechanics, for all astronomical phenomena which were then observed and which were essentially confined to the determination of the positions of moving stars, and of the energy of gravitation by which they are held together in single groups, like the solar system, for example. With the exact recognition of the nature of these two kinds of energy, begun by the investigations of the sixteenth century and terminated fundamentally by Newton, this astronomy of position became an essentially completed science, in the case of which, to be sure, there was refinement and inner development, but no further extension on the side of ideas. In the last half-century, however, a new and extraordinarily far-reaching auxiliary means has been introduced into astronomy through the discovery of spectrum analysis, by means of which other fields of the energetical sciences, especially chemistry, have taken up their rôle in the development of astronomy. In this connection the natural relation makes itself felt, that geometromechanical astronomy is a necessary presupposition for the investigation of astrophysics and astrochemistry. One must, of course, be sufficiently informed as to the gen-

eral questions of position and motion before one can attack these more intricate problems.

Thus, from this example we see how at first an external thing by its striking character and its technical importance (that of astronomy lies in its application for getting our bearings upon the surface of the earth, especially on the sea and in the desert) takes first those sciences into its service whose development has proceeded sufficiently far for the study and explanation of fundamental phenomena. In its further development it makes use of all the other sciences that can be applied to the existing relationships, and leaves out of consideration those sciences for which there are no possibilities of relationship. The whole development through which astronomy has passed rests upon the fact that the only news that comes to us from the stars is transmitted by light. Only the relatively few celestial bodies—namely, the planets, moons, and the sun—whose demonstrable field of gravity reaches to the earth and influences its movements, show in addition the influence of the energy of gravitation. The entire sphere of the fixed stars, of cosmic nebulae, and of other formations in the universe is so distant from the earth that any effect of its fields of gravitation is in no way demonstrable; in the case of these there remains only radiance, therefore, by which any energetical communication whatever takes place with the earth and its inhabitants. From this fact it may be concluded on general principles that only that which light can tell us can be known by us about the stars, and that since no other form of energy travels from the stars to the earth, it is absolutely impossible to learn anything about other energetical conditions of the stars. Thus, for example, we are thrown entirely upon conjecture as to how biological processes may take place on Mars or Jupiter, for instance, the confirmation or non-confirmation of which is

absolutely without importance to the inhabitants of the earth in so far as there simply does not exist any energetical relationship between the eventual characteristics of the neighboring planets and those of the earth. According to general principles, one may imagine that the use of optical information from the planets may be developed so far that details of biological problems might also be studied, but obviously even in that case the possibility will be considered that other forms of energy, hitherto unknown to us, may be transmitted from star to star, and that we shall be able, if we become acquainted with such forms of energy, to deduce from them corresponding information, just as we now derive all the information that we receive from the stars from the energy of light.

Somewhat different from astronomy as an applied science are the technical sciences proper. Now, while astronomy is busied with the study of existing objects and makes use of their characteristics as basis for their application without being able to influence and change them in any way, in the sphere of technical sciences we have to do with objects and processes upon whose ordering in time and space and upon whose reciprocal action we are enabled to exercise considerable influence. We use this influence, then, to direct natural processes in such a way as may seem at all advantageous or desirable to us. Man's mastery of nature means nothing more than that he takes possession in an increasing measure of natural energies and learns with increasing skill to exploit them for his interests. At first we see how in regular succession the energies best known to man and most familiar to him—namely, other men's capacity for work—are put to use. This has found expression especially in slavery, which was general in antiquity and at present is being relegated more and more to those regions that are still in a stage of

barbarism. Then the more difficult problem was solved—the employment of the capacity for work in animals for *human* needs. The more recent phase of this general advancement consists finally in the fact that for not much more than a hundred years—but then, however, in rapidly increasing measure—*inorganic energies* have been placed in the service of mankind. This has been achieved down to the present day chiefly by means of fossil coal. But in most recent times it has become possible through the development of electrical engineering to harness the natural powers of water and to place them in the service of human labor, so that they are beginning to supplant the chemical energy of coal in an increasing measure. For fossil coal is not a possession that is being produced continuously and formed anew each year on the earth in proportion as it is consumed by mankind, but it is like an unexpected and unforeseen inheritance which has fallen into the hands of mankind, and which will also be exhausted at a date not remote. All the improvements of technical science which are directed toward a saving in the consumption of coal, or which render possible the exploitation of coal regions which were inaccessible to technical science in the past, can, after all, only postpone but not prevent the complete consumption of the coal supply. And if this accidental inheritance is exhausted, mankind will be forced to put to use that portion of the regular supply of energy—namely, the ever present solar radiation—which it needs for the furtherance of its civilization. Natural water-power represents an energy of this type for raising water by the influence of the sun's rays, and the condensation of vapor on the highest points of the earth represents a continuous process which will not change essentially so long as the conditions of life on the earth remain adapted to the human race.

The fact must, of course, be taken into consideration, that through this very process of running ice and water down from the highest peaks of the earth there results a gradual wearing away of these summits and a diminution of their height, so that upon closer analysis this form of energy is also one which is slowly diminishing. We shall, therefore, have to consider as an ideal solution of the problem some form or other of mechanical contrivance by means of which the rays of the sun may be caught up directly and transformed into other kinds of energy. Technical science, for example, which a few years ago, when the question came into prominence of there being a possible lack of latent nitrogen for producing food for mankind, at once put an end to this deficiency by developing theoretical and sweeping methods for binding the nitrogen of the air until it was rendered serviceable, also envisages such a task with the quiet assurance that it will not merely be solved when, owing to the consumption of the last piece of coal, mankind finds itself face to face with the bitter necessity of a solution, but that the solution will have been reached long before the last treasures of coal have been subjected to exploitation.

As may be seen at once, the problems here in question in connection with procuring primary energy for human purposes are grouped around the energetical sciences. Physics, especially the theory of heat and of mechanics on the one hand, and chemistry in the form of the theory of chemical energy on the other hand, are the basic sciences the theoretical or general mastery of which is a prerequisite for successful technical development. Other technical sciences have other theoretical sciences as a nucleus. For medicine, for example, it is physiology, especially that of man. In more recent times psychology has also been coming increasingly into prominence, and advances in it are rendering possible a

much more sure and successful treatment of mental disorders, anomalies, and defects. The future activities of both sciences will place within our reach in time to come the attainment of a healthier, stronger, and more capable progeny. Thus we can find for each technical science the sphere in which its theoretical foundations are laid and are being developed without reference to immediate application.

The science of civilization is especially fertile in that kind of applied disciplines (indeed, up to the present it has largely consisted of them) in which the theory of law, the theory of the state, education, and finally the whole organization of science, belong as technical branches. Since all the other sciences converge in the science of civilization, we see how extremely diversified this discipline must be in a theoretical as well as in an applied sense, and we see, for example, that certain disciplines, even, which according to previous belief stood outside of science, like ethics, must form a necessary and regular constituent part of sociology. For, from this point of view, ethics also is shown to be an applied science. It is the theory of the way in which and the content to which the individual must limit and direct the activities of his will in order to mold his own life in keeping with his own volition as far as possible, but yet with the greatest consideration for the volition of his fellow-men.

So in these considerations a fundamental fact is expressed, namely, that there does not exist a single class in the mighty diversity of our experiences and activities that could not be subjected to scientific examination,—in which, in other words, one could not work out the recurrent regularities and use them for the prediction and, where one may exercise any influence, for the pre-formation of the future. So on this side, too, science shows its specifically human and social character in a way that would be impossible for either applied or theo-

retical science of any importance so long as the human individual has to depend upon the narrow compass of his own powers and upon the short duration of his personal life. Only by means of the process of socialization, by means of the possibility of communicating one's own experiences and the generalizations derived therefrom to posterity, and indeed, by means of writing, to communicate them for any desired length of time to posterity, independently of any personal factor, has the enormous development of science become possible, of which we are the surprised witnesses as we contemplate the history of recent and more recent times.

These observations, finally, define our position as regards history. Owing to the circumstance that the civilization of central Europe has been erected upon the half-lost traditions of ancient Greco-Roman civilization, the means for attaining a knowledge of that old civilization, which appears so inaccessibly lofty to those striving after it, have enjoyed quite special prominence. And since from the nature of the case it was only a question of phenomena of the past, the means for investigating the conditions of the past and for bringing them to the knowledge of the present age came into correspondingly high repute and have undergone very extensive development. This explains the great respect which all historical disciplines have enjoyed. To begin with, historical disciplines which had to do with scientific, artistic, and religious traditions were, as a matter of course, appreciated to an extraordinary degree. Then this valuation was extended involuntarily and automatically to the investigation of all possible forms of culture of a higher and of a lower degree which were being rendered accessible by means of the same instruments of historical investigation. As almost always happens in human affairs, the means finally became confused with the end, and became in themselves the

object of endeavor, in such a way that the present intellectual tendency of a great number of scientific persons has led them to the point of looking upon a merely exact knowledge of the past alone as an important task of science and worthy of any sacrifice. In reply to this it must be said that historical investigation in itself cannot be considered by any means as a science in its own right. History must rather be looked upon as a scientific technique, as an auxiliary means for the development of science, which, in an especial way, finds application to every individual field of all science. What is now called history was until recently almost exclusively history of rulers, states, and wars, and had reference, therefore, to an exceedingly insignificant part of actual events. Slowly and with considerable resistance on the part of those concerned, the idea has been making headway that the history of technical science and of civilization is a far more important discipline than the history of wars and countries. But as a natural result, again, of accidental historical development, the history of civilization is understood to be rather a history of art, of belles-lettres, and the history of the disciplines connected with them as a history of techniques; whereas every unprejudiced survey of the development of peoples and states teaches us that this development is pre-eminently determined by the technical agencies and capabilities at the disposal of peoples and states, while the artistic-literary side has played relatively only a secondary rôle therein.

Hence a logical history of civilization would be above everything else a history of technical science, and the history of the other intellectual possessions, of religious ideas, of art, and of science would have to be incorporated only as special headings in this general history of human progress written from a technical point of view.

Accordingly we see that an investigation of history would presuppose a still more varied preparation than that demanded above for the philosopher of the future; that is to say, in addition to a wide and fundamental knowledge of all the theoretical or general sciences, it would presuppose a much more detailed knowledge of all the *applied* disciplines, from astronomy to chemical technology and to the theory of natural selection. It is evident that the only attitude mankind in its present stage of culture can take toward these questions is *that the technical science of historical investigation is connected as a scientific method with the pursuit of every single discipline*. And heretofore, moreover, things have so shaped themselves in many places involuntarily. For example, we have historians of mathematics, namely, mathematicians who by means of historical investigation and with philological knowledge and the methods of literary criticism have thrown light upon the history of this particular discipline. In the same way the history of chemistry down to the present time has been written exclusively by chemists and not by specialists in history, for the simple reason that the professional historians have not the necessary knowledge.

What has been brought about automatically in this matter under pressure of actual conditions should now be cultivated farther in a conscious and scientific manner. In each individual discipline, in every pure science as well as in every applied science, the historical part should be submitted to careful scientific study. But it must be particularly noted that this should be done only from the universal point of view of scientific work in general, namely, for the purpose of utilizing logically and methodically the knowledge of the past for discovering general laws and at the same time for predicting the future. The definition given by the cele-

brated German historian, Leopold Ranke, which exercised upon a whole generation of historians an exceedingly narrowing and enervating influence—namely, that the only important thing for the historian to know is how things have come to pass—must be rejected for fundamental reasons. We have not the slightest interest, in and for itself, in knowing what has occurred in the past, for we have not the least influence on this past, and even the most accurate knowledge of it does not enable us to change it in any way desired by us. Only *in so far as the past has future value*—that is, only in so far as one is able from a knowledge of the past to deduce universal laws for shaping in general the field in question, and can apply them for predicting and, wherever possible, shaping the future in the general interest of mankind—have historical studies meaning or a right to existence. If one surveys the present pursuit of many disciplines from this point of view, one will become convinced that even in the twentieth century we still suffer in various ways from unproductive scholasticism, from pseudo-science, which has arisen everywhere from the fact that the means have been confounded with the end, and the correct bearings have been lost as to what is and what is not worth knowing. The past is infinitely too rich in events ever to be exhaustively reproduced even by the most careful and most complete study. For, at the very time we are devoting all our intellectual powers to such study, there actually happens in a moment so enormously much that to try to reconstruct in all its details any part of the past seems like drawing water into the vessel of the Danaides,—the mighty sea of new occurrences at once covers up all islands of this kind, islands that have been won with difficulty. So the essential impossibility of such a task in itself demonstrates its essential impracticability. On the other hand, the question of what relationships, what uni-

formities, what general formations of concepts can be deduced from the knowledge of any past events whatsoever affords us a safe guide that teaches us to judge what fields in the past and what problems of historical investigation are really worthy of study, because there finally results, not the science of the past, but the only science that deserves the name—*the science of the future*.

II

PRINCIPLES OF THE THEORY OF EDUCATION

LET us attempt to picture to ourselves how pedagogy, scientifically systematized, will look in the future. To think of thus anticipating the future is not as presumptuous as might at first appear. For, by means of a methodology that has recently been developed, common to all the sciences, we may also examine the classification and content even of those growing sciences which, on account of extraneous influences, we have not yet been able to develop to the extent that the general scientific and cultural conditions of the age would warrant. We shall first have to occupy ourselves with calling to mind in a short review the entire system of the sciences. With the help of this system we can then answer the question where pedagogy is to be classified. Then, by reason of the place which will be assigned to pedagogy in the system of the sciences, the systematic arrangement of this discipline may be readily deduced according to established principles.

I would call attention to the fact that the totality of the pure sciences may be divided into three groups—the sciences of *order*, the *energetical* sciences, and the *biological* sciences. The sciences of order begin with logic, or the theory of classes; they include, moreover, mathematics and geometry as well as the science of time, which has not yet received a distinctive name. The energetical sciences include mechanics, physics, and chemistry, and, as is well known, have as their chief characteristic the idea of energy, which as yet plays no rôle among the sciences of order,

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having made its appearance as a new subject of study in this second department of science. The biological sciences, finally, are to be divided into physiology, psychology, and "culturology" (*Kulturologie*), the first having to do with the most general phenomena of life, the second with those special phenomena called processes of the spirit or mind, and the third finally with the biological-psychological phenomena which occur exclusively or wholly in the highest species of living beings, man. These specifically human peculiarities which differentiate the race of the *homo sapiens* from all other species of animals is comprehended in the name *culture*; therefore the science of specifically human activities may be most suitably called *culturology*. It coincides practically with what has been called sociology. This name, however, is not entirely appropriate. The fact of association, to be sure, is extremely important for the development of human culture; but, on the one hand, it is not the only determining factor in this field, and, on the other hand, there are so many kinds of associations among animals and plants, and even among minerals, that one cannot employ the idea of social organization as a specific characteristic of this highest of the sciences.

Now, there exists between the sciences just mentioned the relationship that the first mentioned more general sciences always have an influence and sphere of application in all the sciences that we have mentioned: physics finds its application in chemistry as well as in all the biological sciences, but no application in mathematics, logic, geometry, etc. The higher, therefore, a science stands in this succession, or the later it has been named, so much the more do earlier, fundamental sciences come into consideration in connection with it and contribute to its content for classification and examination. While, for example, chemistry employs as aux-

iliaries or presupposed sciences only logic, mathematics (including geometry), and physics, there come into question in every individual science belonging to culturology, one after another, *all* the sciences, and from this there result naturally a division and an exhaustive view of all the problems which are to be solved in that particular science.

Before we pose the chief question and its answer, to which of these domains pedagogy belongs, we must state by way of premise that, by the side of the pure sciences just mentioned, there are a great many special disciplines that are called *applied* sciences or techniques. They share with the chief sciences the application of the laws of nature, but differ from them in that their goal is not systematized learning and order, but some practical problem the solution of which has forced itself upon man as a necessity. So medicine, for example, is that kind of an applied science or technique that makes abundant use of all the sciences up to and including physiology, and in some of its disciplines it employs also psychology and the science of civilization (*Kulturwissenschaft*). Each applied science has, like medicine, its fixed center of gravity in one of the pure sciences. It will therefore, as a matter of course, use in its functions all the more general or subsidiary sciences also, while little—under certain circumstances nothing—from the higher sciences comes into consideration in connection with it.

We have now made the necessary preparation to enable us to designate exactly the position of pedagogy in the whole system of the sciences. In the first place, there is no doubt that pedagogy belongs to *culturology*. As we have already seen, pedagogy is concerned with handing down the culture of the present living generations to the ones coming next. We recognize, furthermore, that pedagogy is an *applied* science, since it is not a question here of purely perceiving,

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systematizing, and ordering any natural facts, but it has rather as its purpose the influence to be exerted on the growing youth in the manner often described. *Pedagogy is, therefore, a chapter of applied culturology or sociology*, the pure sciences appearing as sciences subsidiary to it, since culturology as the supreme or ultimate science is in its way dependent upon all the earlier or more general sciences. We shall, therefore, get a view of the whole content of scientific pedagogy if, with respect to pedagogical problems, we inquire into the influence and importance of each particular science.

Before investigating the relationship of pedagogy to the several single sciences that become step by step more complicated, we have still one general point to settle, the more important features of which I must at least touch upon in order in some measure to answer at the very outset questions that may possibly arise. We shall have to call to mind that the problem to which we are now turning has two different sides. I mean that the question involves not only the influence which the various sciences exercise upon the *subject-matter* of instruction, but also the influence that they exercise upon the *process* of instruction. Accordingly, both matter and form of instruction are influenced simultaneously by the various sciences, and it seems logically and methodically imperative to keep these two sides always distinct. I should anticipate right here, and say that such a division does not influence the results of our examination to any great degree. I must admit that I myself was astonished to see how much these two questions merge and hang together, thanks to the general method to which they are here subjected. From this fact we may draw the general conclusion that on arriving at a really rational solution of the problem, the two phases of pedagogical science will show

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themselves to be closely related; that, in other words, the content of instruction determines its method adequately and absolutely.

We recognize this most clearly, perhaps, in the very first heading to be treated, in the relation between logic—or rather the theory of multiplicity—and pedagogy. Owing to a strong movement which is making itself very evident in present-day science, the former unqualified veneration for the Aristotelian logic has been giving place to the more recent notion that what we with justice call logic is nothing more than the theory of the most general and most commonly recurring relations among different things and their concepts. Accordingly, there come into question, not only the manner and means by which from two propositions a third may be construed (the exclusive content of logic hitherto), but also a more universal problem. What modern logic treats of is how things may be classified, how the resulting groups may be mutually co-ordinated, and what results and laws ensue therefrom. From this point of view we see at once that the whole province of human speech belongs in this large general chapter. Speech is nothing but a system of signs which we associate with the system of concepts, and which we have formed for ourselves for the purpose of transmitting our ideas to others by means of language. Language serves, therefore, for the *communication of ideas* by means of the following process: Some definite sign is associated with a given idea, and this sign must always be the same for that particular idea. If, now, another person is led to connect the same ideas with these signs, he “understands” the language in question; that is, on recognizing the signs, he forms in his mind the same idea that the first person had in mind when he produced the sign. We are thus concerned here with an unusually general and therefore im-

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portant case of the association of two groups, the concept group and the lingual sign group.

Soon, however, this phenomenon assumes another aspect by reason of the fact that we are not able to satisfy ourselves in all cases with spoken, phonetic symbols, lasting but a moment; we find ourselves, on the other hand, forced for many purposes to associate enduring symbols with our ideas, such as are employed in our written language, *script*.

This means, pedagogically speaking, that what the child must first acquire is the ability to form and employ a number of ideas that are connected and sufficiently clearly grasped, as well as the ability to associate with these ideas the conventional speech symbols of its mother tongue. Only after the co-ordination of words has been completely established and fluently learned can the association of written symbols follow. Along with this a new fact makes itself felt, namely, that when a group *A* is associated with a group *B*, and again a group *C* with group *B*, then groups *A* and *C* prove to be co-ordinated. Now, if one represents the symbols of speech by means of letters, without concerning one's self about the sense of these sounds,—that is to say, without reference to their associated ideas,—one obtains again a system of symbols, the written language, which is co-ordinated quite as closely with the original ideas as the sound language was.

In methodical presentation all these things look rather abstract and uninteresting, but they assume at once a concrete form as soon as one envisages the real pedagogical problem in connection with the child-mind in process of development, viz., on the one hand, the formation of clear and precise—that is to say, sharply differentiated—ideas, and, on the other hand, the association of the symbols or of the words with these well-understood concepts. Obviously,

this analysis gives as a result (and in a way which is to most persons as unexpected as it is illuminating) the principle of the industrial school (*Arbeitsschule*). The phrase "industrial school" is one of those phrases the co-ordination of the meaning of which is not quite clear, probably because there is such a lack of definiteness to overcome in the idea itself. In the light of the observations just made, one sees that the industrial school comes to mean in the lower grades that the cultivation of the *formation of ideas* within the range accessible to a child proves to be the first and most important mission of the school. Therefore, during the first year, when the teacher with his class looks about him chiefly in the school-room, afterward in the house, street, or field, and describes the various objects and situations and gives names to them, he is carrying out the most elementary pedagogical application of the first and most general of all the sciences—the science of co-ordination, or logic. At the same time we recognize the fact that the method hitherto employed—*i.e.*, that of beginning to teach reading and writing as soon as possible—is shown, in the light of this analysis of earliest school activities, to be unfit for the purpose. The most important thing, because fundamental, is first the formation, co-ordination, and clarification of *ideas*; and since this work necessarily forms a basis for all else, a corresponding amount of pains and care must be bestowed upon it. Above all, it must not be demanded of children that they represent and reproduce ideas before they have grasped clearly the content of the idea itself. Only after the child, within the range of its experience, can express itself fluently about the ideas that present themselves and about their mutual relations,—when, for example, it can relate its little experiences coherently,—then only does the question present itself how we are to co-ordinate with these abstract representations expressed by

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sounds those expressed in lasting symbols. In other words, one will not begin with instruction in writing and reading till about the end of the first year, and this year will be devoted almost exclusively to the cultivation of the processes of conception.

Now as to the association of the written and printed symbols with the ideas and their sound-symbols, we know that German schools suffer most seriously by reason of the variety of alphabets, the number of which (large and small, written and printed, Roman and Gothic) amounts to no less than eight. I do not wish to permit this opportunity to pass without again urgently calling attention to the fact that, in the first place, the so-called German, or Gothic, script has nothing to do with the idea of "being German," and, in the second place, it proves to be a serious hindrance to the mental development of our children and of our people. Not even a half-educated person may avoid learning the Roman script, printed as well as written, because, for example, all the notices on the railroads, the street corners, etc., and the characters on all typewriters, are in this script, for the very simple reason that it is much easier to read than the Gothic script. The knowledge of Gothic script is therefore necessary only for written and printed statements in which it is still injudiciously retained, and in which its discontinuance is only a question of time. While it is true, for example, that in our daily press most of the general news items are still to be found printed in Gothic characters, nevertheless news of scientific and commercial character, which it is presumed will be read by readers of other nationalities, is already being printed quite generally in Roman characters. It would not occasion the slightest difficulty, but rather bring about far-reaching relief in the ratio of 2 : 1 in the instruction of children, if one should forego completely all knowledge of the

Gothic script in the early years of school, and leave acquiring a reading knowledge of it (for writing it is completely superfluous) till a riper age.

This explanation of the material content of primary education gives us at the same time an insight into the corresponding pedagogical procedure. At this stage the teacher will, above all, see to it that he promotes to the best of his ability the formation of concepts, that he compels the children to represent accurately to themselves the characteristic and constituent parts of the various ideas they possess, and he will also take care that the very clearest and most definitely co-ordinated words are employed for the clear and definite ideas thus obtained. Just here many difficulties may be encountered, for all the so-called natural languages (*i.e.*, those which have developed unsystematically) leave much to be desired as regards order and regularity, and therefore often violate the prime requisites of logical association—above all, the necessity of *avoiding ambiguity*. The capacity of the teacher will be shown by his skill in overcoming these internal difficulties of our present language, and in pointing out to the children the existing obstacles and ambiguities in order that these may be avoided. As an example of the extent to which the material analysis of the content of instruction also elucidates the method of imparting it, I need only mention, in passing, that in the logical analysis of first conceptions it is necessary, from the point of view of method, to separate learning how to write from learning how to read, and to place the former, as the more difficult art, at a later period, when the relation between the idea and its written symbol has become completely comprehensible.

After this first division of the sciences there follows quite naturally the second—the theory of quantities, or mathematics. Reading, writing, and arithmetic are the traditional

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subjects of elementary instruction, and in the very same way experience has brought us to realize that arithmetic should not come until considerably later, when the more general elements in the systematization of mental processes have been treated and made familiar to the child. One cannot build up the science of mathematics logically, nor can that science, therefore, be rightly understood if one has not first acquired a clear grasp of the ideas appearing in the sphere of order, and of the mutual relations of those ideas.

It is also a matter of common knowledge, and one that is making more and more headway in our day, that after arithmetic should come the simpler elements of geometry. Of course, for definite logical and philosophical reasons, geometry should not be taught in the form of Euclid's Exposition, but rather as an empirical science, which it certainly has always been. It is just here that the special side of the modern industrial school makes itself felt, where the child, by handling objects of dimension, by producing them from plastic material, and by their respective transformation during the process of alteration, will acquire a quantity of notions regarding practical geometry at an age when the usual instruction, by reason of statements that are abstract and (for a child's mind) too general and empty, would lead nowhere. Helmholtz himself states that the principal theorems of geometry were perfectly familiar to him the first time they were taught him in school, and that this was due to the blocks with which he had played during his early years, when he was repeatedly compelled to keep to his bed.

With these hints, let us leave for the present the subject of the sciences of order, as regards their influence upon the theory of teaching. In connection with the reflections just made, a hundred other relationships, which naturally follow

from what has been said here, will have suggested themselves to every teacher, but they cannot here be analyzed singly. For as soon as one begins to undertake a systematic examination, the subject-matter grows irresistibly into a complete system of pedagogy, the analysis of which would require not the few pages at our disposal, but volumes.

We shall now turn to the second department of our classification, the *physical* or *energetical sciences*. In case we desire for symmetry's sake to preserve the tripartite division, we may divide them into *mechanics*, *physics*, and *chemistry*. It is a matter of common knowledge that it is customary to impart these sciences to the child only in the higher grades of instruction, but their relatively early position in the realm of all the sciences suggests the possibility that by postponing instruction in these sciences in the case of the developing child we have not heretofore waited too long. Here, too, we must distinguish very carefully the pedagogical presentation of the subject-matter connected with the daily concept formation of a child, by which at first only the general content and general processes of the science are demonstrated by means of natural examples from the exact, logically ordered, and systematic presentation of the whole science. The sciences to be considered in this connection are already so highly developed theoretically that even their general propositions may be made perfectly intelligible to a child. I need only remind you that elementary mechanics of the spade, wheel, lever, and hammer, gives a sufficiently complete introduction to the idea of energy, and can explain quite interestingly, even to the slightly developed mind of a child, the law of the conservation of energy by means of the general principle of the conservation of work in machines. I recall, in my own development, that at the age of twelve or fourteen I was sufficiently advanced not only to incorporate

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these things in my memory, but also to find that inward intellectual pleasure in their arrangement and in their respective relations the production of which is the most effective auxiliary of every good teacher.

These hints concerning the content of instruction, in so far as it has to do with the energetical sciences that I have mentioned, may suffice. On the other hand, the application of suitable fundamental concepts in the method of instruction is deserving of some attention, even though it does encroach to some extent upon the subject-matter of physiology. The teacher must accustom himself to treating the child as an energetical machine,—which, like every other organism, it really is,—and to conforming his treatment to the principles of energetics, whose first and most important axiom is that perpetual motion is an impossibility. In other words, it is not possible to produce work out of nothing; but rather, the only way to realize work consists in transforming other stores of free energy into the needed form. Unfortunately, the pedagogy that has been practised up to the present has paid very little attention to this basic law of all natural phenomena, though it circumscribes the sphere outside of which nothing can ever occur. Our present pedagogy is predominantly pedagogy of the *will*. By working upon the will of the child, with a view to reward or punishment, we have attempted to attain the desired results, and in case of failure to supplement it with all the more powerful influences upon the will in proportion as the real performances fall short of those desired. I do not mean to intimate that we should fail to recognize that influencing the will is a factor, and a most important factor, in all pedagogy. This influencing, however, is possible only *within* the scope of the laws of energy; and where the demands involve an infringement of these laws, even the most powerful influence on

the will accomplishes nothing. If a child that has not had sufficient sleep and is underfed is expected to do normal work in school, and if the teacher, either voluntarily or by virtue of the regulations, forces the child to do that normal amount by influencing its will-power, it is a question of nothing but the attainment of perpetual motion, the possibility of which, however, is excluded by the most important synthesis that science knows. A child that brings with it no store of energy into school possesses also no forms of energy which it can transform into the work demanded, and all the influences brought to bear upon the will, from affectionate admonition to severest punishment, cannot alter the situation in any way.

The beginning of a more practical understanding of these conditions is beginning to make itself felt in many directions, in so far as care is taken, thanks to charitable foundations, to provide weak and underfed children, before the beginning of school instruction, with the necessary stores of energy by the distribution of milk and bread. But these distributions are looked upon at present more in the light of charity, and it is taken for granted that one is doing something unnecessary, whereas more careful consideration teaches that the work of the teacher expended upon children of that kind, who are provided with insufficient stores of energy, is quite useless and in its way a waste of energy. Every township, therefore, that does not see to it that working children have really something to consume, that they are physiologically capable of work, spends the money used in school instruction in exactly the same way as a manufacturer would do if he attempted to construct his product with poorly made machines, dull files and knives, and similar inadequate apparatus.

We turn now to the biological side of pedagogy. The following circumstance is to be noted, which is of consider-

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able importance in the problems of method which confront us. To a growing child a beetle is relatively much more interesting than a stone; the attitude of other people toward it is much more a subject of notice than possibly the phenomena of the clouds or the actions of electrically charged Sambucus balls. This is a circumstance which is connected quite naturally with the formation of concepts. The child forms its first and most familiar concepts in immediate conjunction with its daily experiences; that is to say, other people are, above all else, absolutely and indubitably objects of interest to it, and other interests follow these only in proportion as they are conceived as being less and less like man. For this reason it is much easier in school to awaken an interest in animals and plants than in minerals and physical experiments. So a certain antithesis makes itself felt between this natural organization of the human mind and the logical construction of the sciences. For the latter begin with the most abstract ideas, those lying farthest from the developing mind of the child, and ascend from them to the ever more varied and therefore more comprehensible ones lying nearer to the perception of the child. This seeming contradiction is explained by the fact that the former more general branches of knowledge, as has been explained already, are introduced as entirely empirical subjects. By no means do we dare entertain the idea, so far as a child is concerned, of an exhaustive, systematic presentation of them; but we should rather make use only of those parts thereof which, in the daily life of the child, prove themselves to be necessary and therefore familiar, and in the end also interesting. And so at this early age one will not wish to give a systematic presentation of physics and chemistry, but will, of course, rather familiarize the child with the fundamental phenomena that daily life brings with it, without special

reference to formulating them. At the point where the two divergent lines almost meet—viz., where the conceptual faculty of the child has already advanced to a knowledge of animals and plants—the contact with more general and more abstract concepts will be brought about by ascending the scale of science and by the diminution of childish interest. That zoölogy and botany can be taught with success at an age when systematic physics or chemistry could not yet be taught is due to the fact that, in presenting to children at that age the science of animals and plants, the exposition is limited to their appearance, and to those circumstances of their being which resemble similar functions in man. It is merely a question of the continuation of the theory of concept formation to which we referred in our discussion of the most elementary stages of systematic instruction. Instruction in the physiology of animals and plants cannot be accomplished otherwise than upon the basis of a sufficient knowledge of chemistry and physics, and should be postponed to a very much later period.

So much for the content of instruction as regards the departments just mentioned. The method has been touched upon already to some extent, my observations regarding the energetical side of the question having suggested the premise that a child is a living being, a biological organism. At all events, we may add here a few additional remarks growing out of the physiological and culturological phases of the subject. As far as the application of physiological laws to the method of instruction is concerned, this is a department of knowledge that has begun to be opened up only very recently. It is less than a decade since we began recognizing that all pedagogy presupposes the knowledge of psychology in its application to teacher and to child; that all scientific pedagogy, therefore, must begin with the study of

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child psychology and the psychology of the processes of instruction. This, of course, is not the most important influence that psychological knowledge has had upon pedagogy. On the contrary, the highly endowed empiricists of the past, to whom we are indebted for the best in all that has been accomplished and systematized heretofore, recognized these fundamental relationships long ago as a matter of course and put them to practical use; as, for example, the precepts that the simple must precede the complex, that the mind must not be fatigued by being occupied too long with one subject, etc.

Among the empirical results thus obtained I wish to lay particular stress upon one only, because to my mind too little emphasis has been laid upon it, although it is absolutely fundamental for the successful solution of the problem of teaching. In the course of an investigation undertaken years ago for an entirely different purpose, I attempted to account for the principles which, in conformity with natural laws, might be established as regards the most general problem of every human life, namely, the attainment of *happiness*; and I came to the conclusion that the most important requisites for happiness are, first, the greatest possible amount of completely transformable energy, and, secondly, the greatest possible amount of energy transformed voluntarily.¹ The workings of human energy may be divided into two parts: one that is transformed in complete conformity to the actual will of the person in question, and another that is brought into transformation under the influence of compulsion of some kind. A life filled only with forced activities repugnant to the will is felt by everyone to be a condition of the greatest unhappiness. On the other hand, the various prov-

¹ Cf. "Die Forderung des Tages" (Leipzig, Akad. Verlagsges., 1911), S. 217.

erbs on the subject of happiness reveal the fact that activities which are in conformity to volition have long since been recognized as the absolutely necessary premise to every sensation of happiness. But at the same time, energetics also teaches that the result of every transformation of energy depends, first, upon the total amount of available energy, and, secondly, upon the quality-ratio—i.e., upon the proportion of raw energy that can be transformed into the form desired for the particular purpose. Accordingly there appears a remarkable parallel between the quality-ratio and the sensation of happiness; that is, the highest quality-ratio is attained when the transformation ensues with the least resistance: for every resistance that must be overcome consumes an expenditure of energy which must be withdrawn from the principal objective. In the same way, happiness increases with the diminution of resistance. From this it follows that in school the children will accomplish a maximum of work when that which they do is accomplished with the least resistance, under the least possible coercion on the part of the teacher, and hence with a maximum of sensations of happiness. *Therefore, in the feeling of happiness on the part of the pupils we have a means of measuring the expediency of the instruction itself.* The happier a pupil feels during the recitation hour, the greater will be the success that the teacher may expect from his instruction during the period.

These analyses in the domain of psychology and energetics coincide with experience in accordance with which those teachers who understood how to train their pupils to joyous and enthusiastic participation in their tasks actually had also the very best success in their instruction. Not only is it a fact that children are accustomed to cling to such teachers with lasting gratitude, but that the immediate and

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concrete results of teaching under such circumstances are incomparably greater than those obtained by severe teachers through employing coercion. If children are forced against their will to work on assigned tasks, only transitory results at best ensue. The children cram their minds with the subject-matter demanded for the quizzes and examinations; they forget these things learned unwillingly very quickly, however, and the result is nothing but a lasting detestation of the teacher and a vacuum in the ill-treated brain.

In order to make this important principle clear by an example, I should like to recount a purely empirical and unintentional confirmation of it, for which I am indebted to the well-known pedagogical reformer, Berthold Otto. Berthold Otto describes what he calls *Gesammtunterricht* ("joint instruction"), a system discovered and developed very completely by him, by which the children themselves, with their questions and observations, assume the conduct of the exercises of instruction and the teacher is present merely to maintain a sort of parliamentary order (which requires but very little oversight) and to give the actual information which the children do not possess, and for this purpose he employs as an aid either his memory or an encyclopedia ready at hand. Students of pedagogy who visited his classes afterward complained to the leader that the children sat around in such disorderly fashion, that each particular child sat at its desk in a different attitude, and nothing at all was to be seen of the order that is carried out in a military way in a normal class. Otto was accustomed to answer this by saying that in the beginning he, too, had endeavored to bring about greater uniformity; but the difficulty of attaining orderliness while the children were following with eager interest the content of the subject-matter under discussion had led him, from a pedagogical point of view, to forego this re-

quirement. And not until I had called his attention to the fact that the matter was a simple question of the law of the conservation of energy, that a child could not at one and the same time give its complete attention to the content of the questions posed and give heed to the position in which it sat at its desk, and that a demand made in the one direction necessarily resulted in a diminution in the other,—not until then, I say, was a theoretical motive shown for that which his pedagogical instinct had led him to see was right.

The same observations may be made concerning the much discussed question of the independence of the teacher as regards the managing of the children and the treatment of the subject taught. If one watches a group of workmen at work, one will find that almost every one of them handles his tools in an individual manner. This is due to the fact that all men differ from one another, and that the conditions under which each of them uses a particular tool most practically must accordingly differ from one another. The dissimilarity of teachers in mental as well as physical organization must necessarily cause their methods of instruction to differ. Every form of coercion that does not take these personal differences into consideration, and that seeks to bring about a uniformity not justified by weighty reasons, only serves to diminish in the teacher the quality-ratio of the work of instruction. From these observations we shall have to conclude again that uniformity is to be striven for only in so far as it is shown to be urgently necessary for the organization of the school system as a whole; that in drawing the line between freedom and constraint, however, it is better in case of doubt to place our line of demarcation more toward the side of freedom than toward the side of uniformity. In such circumstances there exists a greater probability of better quality-ratio in the functions of the system of instruction as

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a whole, and this, after all, should be the chief aim of all educational administration.

Yet another great division of our subject remains to be treated finally, namely, that of the application of *sociology* to the school. For even though pedagogy comes under the head of applied sociology, this does not mean, after all, that it stands isolated from the other branches of this science. On the contrary, since it is a question of applied method, we must investigate the entire range of sociology in connection with its influence on pedagogy and its method of application. We see at once that we are confronted by an almost inexhaustible problem. Here again we shall have to content ourselves with a few brief suggestions as to how far the application of scientific sociology influences, on the one hand, the method, and, on the other hand, the content, of instruction.

Now as to method, it is a question of consciously linking our growing youth, by means of education, to the whole cultural fabric of the present; and one sees at once how far-reaching and elucidating is the light which falls, owing to this relationship, upon our present educational system. Quite an important part of secondary education (a short time ago one had to say the vastly greater part of it) hinges upon the acquisition of the two ancient languages, Latin and Greek; and the so-called humanistic or rather philological gymnasium insists upon the tenet that by the acquisition of these languages, and of the old culture of the Greeks and Romans connected therewith, by far the best means for the attainment of culture is placed at the disposal of modern man. The former point of view, that the culture of the ancients was so incomparably superior to all other possible cultures that we for our part can only hope to attain to a certain degree of perfection by the imitation of their attainments, is still prac-

tically held; theoretically, however, it has essentially been given up. For the representatives of the philological gymnasium are now attempting to establish their system upon essentially different grounds, since both classical philology and archæology have also begun to incorporate the history and works of the Greeks and Romans in all the events of the history of the world, and especially to occupy a more critical attitude toward the products of their art and philosophy. On general principles, the following must be emphasized in this connection: The fact that man is a being capable of development, that his present conditions of existence are therefore better, nobler, more favorable—in a word, more valuable—than his earlier circumstances were (all of this to be taken on a basis of general average), necessitates a different appreciation of old things as compared with the new. Owing to a natural error whose obviously possible origin I have explained in another connection,¹ we have arrived at an overestimation of old things, in comparison with those that we now have, which has repeatedly led to confusion of thought in our cultural work and prevented us from attaining a right point of view. If we look at the matter simply and soberly, it does not admit of a doubt that those peoples whom we are accustomed to call the ancients were actually young; they lived some thousands of years earlier than we, and our civilization has been able to evolve by employing all the cultural results won by those earlier and younger peoples. Expressed in other words, this means that, viewed from the stage that we occupy in man's development, we *people of the present day* are the *oldest* of all peoples, the ripest, the most developed, the people who culturally stand highest, and all other, earlier stages of human development stand, as compared with the present, in a backward position

¹ Cf. "Die Forderung des Tages," S. 282.

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for the reason that humanity at present can and may use what humanity in the past has laboriously produced. In this connection, of course, we must take into consideration the fact that the road upon which man has developed in the past, especially in the earlier ages, was not a road continuously rising, but rather it ascended and descended in great waves. There arose, especially after the destruction of the culture of antiquity by the migrations of the nations, a cultural vacuum for the filling of which the remains of earlier culture first had to be drawn upon. But in the meantime we have long since passed beyond this void. Great new and fundamental realms of culture, especially in the sciences, have been disclosed; and should we compare our present condition with that of the Greeks, or even of the Romans, we could boast without any exaggeration of a much higher degree of progress. The single circumstance alone, that for hundreds of years mankind has been taking into its service various kinds of inorganic energy, especially from fossil coal, means such an enormous freeing of human labor from the monotonous toil of muscle without any addition of mind, that by this very fact alone our claim is established that we stand upon quite a different height of culture from any that could ever have been reached by the peoples of antiquity. Did not Aristotle, in complete accord with the point of view of his time, emphasize the fact that slavery would never cease because one could not otherwise conceive how the rest of humanity would be able to get flour for their food? So, in the last analysis, one sees there is nothing in making use of the civilization of antiquity as our highest ideal of culture. An ideal, as I have often explained, can lie only in the future, never in the past; and every ideal that is artificially sought in the past is only a means of reaction, and is from its very nature inimical to culture. Thus we are experiencing in our own day the fact

that the philological gymnasium is irresistibly approaching gradual extinction, in spite of the constant and inconsiderate support given to it by the ruling reactionary classes in Germany, for obvious political reasons. The contrast between the cultural needs of our time and the cultural means that the philological gymnasium can transmit is too great and glaring for this remnant from the Middle Ages, that was skilfully galvanized anew a hundred years ago, to be kept alive in the long run. The yearly increasing attendance at the non-philological institutions, as is shown by statistics that are more and more favorable to them, speaks in a language which in this connection is not ambiguous.

Now, by an illogical application of the fundamental biogenetic law, they have attempted to justify the education of our growing youth through the example of the Greeks and Romans, by saying that just as every organism must by way of short review pass through the various stages of development of its species, in the same way it is also necessary to mental development that our children who are destined for higher education should also pass in school through the earlier stages in the development of humanity. If this were true, and if this argument were taken seriously, then our poor young gymnasium students would first have to learn Babylonian and Egyptian culture and history before they could be introduced to the joys of Latin and Greek grammar. None of the educationalists have dared this consistent application of the argument which they have employed in the defense of teaching Latin—*i.e.*, not one of them has taken his own argument really seriously.

We must repeat, therefore: *all the lower and higher school instruction at present must be determined absolutely by the cultural needs of the present time.* The lack of sociological training which has been brought about by our con-

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fining ourselves to the culture of antiquity, and hitherto to a purely external presentation of history that is principally related to wars and battles, and to the establishment and fall of empires, cries for immediate remedy. It has arisen from a completely false conception regarding the factors of culture, and the history of governments must be supplanted by the *history of civilization*. A modern child would learn what is infinitely more valuable and useful for its future life if it acquired an accurate grasp of the development of agriculture, of mining, of transportation, of the steam-engine, and so forth, than if it learned by heart all the battles of Julius Cæsar down to the last details.

The fact that this real history of man's development—the history of the conquest of nature by mind, or the history of technology and science—is as yet hardly written, to say nothing of its being taught in the schools, is clear evidence of the small extent to which the fundamental sociological facts have been employed heretofore as a subject of study in education. The modern call for instruction in sociology merely reflects the fact that we are becoming conscious, little by little, of this oversight, and are now seeking means (not always the most apt and suitable) to fill out this baneful gap in the training of the modern pupil. In fact, it is almost unbelievable when one calls to mind the present situation in all its naked truth. The very pupils who are destined in one way or another to be hereafter the leaders of the nation as teachers, judges, physicians, or ministers, do not receive during the most important period of their development in the gymnasium the slightest competent enlightenment about the ways in which the cultural, economic, and political organization of the German Empire is formed, nor how hereafter they will have to co-ordinate their civic life with its duties and its rights in the life of the nation as a whole.

And when, in conclusion, I come to speak of the influence of social science upon the method of instruction, I may encounter a reproach which often enough has been cast upon me unjustly by those who feel themselves disturbed in their present prerogatives and positions of comfort. The reproach intimates that I only know how to bring destructive criticism and fruitless fault-finding into the school question, and that I exhibit no positive or helpful activity in this field. The fact alone that until recent years I had passed my whole life—and successfully, for that matter—in educational work should be sufficient to nip objections of this kind in the very bud. But when I have characterized that which we now have as being largely in need of improvement, I have done so over and over again by giving always an exact explanation of the reasons why I considered it bad, and in so doing I have specified the exact direction which improvement must take. Just here, in connection with the question regarding the application of sociology to the technique of school-teaching, opportunity is afforded to advance a good step further in the matter before us.

Our present school organization—and this fact must be placed before everything else—is not arranged essentially with reference to the greatest possible advancement of the child, but with reference to the most convenient administration possible in the hands of the officials in charge. The thought underlying our whole present school organization is the supposition that all children are identical in character. They are received into the school at an absolutely prescribed age, and then the object to be attained is that from year to year all, in like periods of time, take up and master the absolutely prescribed portions of knowledge assigned to them, which are alike for all, so that they may advance each year to a new class, and, if all goes well, may be dismissed

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after a normal lapse of time with their diplomas. Such a scheme, of course, is outwardly more readily handled than any other; for, to begin with, it is as trivially arranged as could possibly be imagined. Viewed, however, from the standpoint of its pedagogical effectiveness, it is the crudest imaginable, and therefore the most barren of result—yes, the most harmful. The supposition that all children are organized alike, that they develop with the same rapidity, that they have the same degree of interest in the various subjects, and therefore can be carried over similar distances in all the various subjects in a fixed average time, contradicts the facts in every particular. To force a system that rests upon this hypothesis can lead at best to most serious conflict with reality. For example, we are already quite accustomed toward Easter-time to hear of a number of cases of suicide among pupils, and of many other pupils who have left home secretly, either for fear of punishment or on account of shame due to a poor report.

The contention as to whether the school or the home is to blame for the situation—the reproach brought by the school, for example, that, owing to incorrect management at home, children are made nervous and irritable, and are therefore no longer able to satisfy the necessarily strict demands of the school—is fruitless. We are confronted by the situation that the present school system leads to these fearful results that are becoming worse each year, and the only conclusion that can be drawn from it is that causes which have such deplorable results must be eliminated. These causes, however, lie in the contradiction between the school organization and the actual characteristics of the pupil, between the schematizing of personal development by our school organization and the infinite variety of actual life, which is sharply opposed everywhere to the scheme. In

addition to this, there is added a frightful amount of uncharitableness toward the pupil, for which the teachers of the higher schools more than those of the elementary schools must be blamed, and this is due to the unsuitable training of the teachers. Quite a considerable portion of our teachers in the gymnasiums and similar institutions consider themselves to be Pegasuses in harness. In the university, owing to hunger for scientific activity on the part of their professors, they are led into scientific work; they consider this their real calling in life, and therefore feel that a violence is done their minds because they are forced to teach children. The result of this is that the dissatisfaction that they feel toward their profession and their work is discharged on the defenseless victims in their classes. And even though a conscious reaction of this inward discontent upon the children may take place only in very rare cases, nevertheless the unconscious discharge of this continuous feeling is a phenomenon so natural that it must be expected in all cases where it is not counteracted by an especially energetic sense of pedagogic duty.

The actual situation is a contradiction of the premises upon which our present school organization rests, the complete falsity of which its representatives have probably scarcely ever realized. Everyone who has seen a few children develop side by side realizes at what different ages the same stage of mental development may be noted. One child learns to speak in the first year, another in the third, and the same differences may be recognized in all forms of mental activity. When, therefore, a group of six-year-old children in whom a difference of almost a year may exist are, under the formal administration of regulations determined by the accidental date of birth, brought together before the teacher, the group by no means represents a uni-

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form, but rather an exceedingly heterogeneous mass, and every teacher knows how varied and individual the attitudes of mind are that children assume toward instruction. As time passes, these differences not only continue to exist, but generally become more marked. The tasks of the classroom, however, demand uniformly rapid progress on the part of each individual. In order to enhance this pedagogical nonsense to the point of incredibility, a child is kept back in the class a whole year, according to the regulations, if it exhibits a deficiency in one or two subjects, regardless of how good its attainments in the other subjects may have been. This only brings about a further disarrangement of mental poise, for non-advancement means a further mistreatment of the developing child, as it is prevented from prosecuting the very things which it can perform best, and in which, therefore, it has abundantly fulfilled the demands of the school. Instead, the child must work at the disagreeable thing, and in the field to which its ardent desires are drawn it again has set before it only what is so well known that it is wearied of it. This outward schematizing in year-courses and classes, in hour-divisions alike for all, and into lessons in connection with which not the slightest consideration is paid to personality, causes the many failures in school and necessitates also the dismal phenomenon just mentioned—the complete decay of the vitality of the child owing to the circumstances under which it must live.

The question as to how one can interpose in the matter with a view to improving conditions is answered in a practical way by experience in other fields where school bureaucracy, fortunately, has not yet been permitted to make its entrance. From my own experience of almost a quarter of a century as a laboratory teacher of chemistry, I can say that *by a free arrangement of instruction as regards time and*

content vastly much more is accomplished than by the usual schematizing. If children in the schools were only treated just as we university professors are accustomed to treat our students in the laboratory, and as very young children are treated in the kindergarten, incomparably better results would be attained. Each child is set at its task and attempts to do its best with it, in proportion to its attainments and to the rapidity of its mental reactions. Just as in the laboratory we do not force the slower worker and do not hold back those who work fast, in exactly the same way children should be permitted to determine the rapidity of their development. From the general energetical reasons explained above it seems obvious that in this way by far the best results will be attained.

Only by this kind of instruction is it possible also to develop *social* acting and thinking in children. It is considered at present one of the worst school offenses for one child to help another solve its task. The one receiving the assistance is punished as well as the one who was ready to impart the help. *Is, then, mutual willingness to render help a characteristic so exceedingly general that it must be systematically done away with in school?* Is not, rather, egoism and narrow-mindedness a fault under which we suffer severely? I do not hesitate to express the conviction that a considerable amount of this illiberality is imparted to our growing youth in school by the prevalent notions regarding this mutual help and the usual treatment of it.

So necessary a characteristic, socially speaking, as the willingness to be of mutual assistance should rather be cultivated in every way possible by the schools. This, to be sure, is not possible in the thoughtless schematization of the present school curriculum; it becomes, however, an important pedagogic factor as soon as the system of unhampered in-

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struction just described is introduced. Then those children who learn more quickly and grasp an idea more readily will become, spontaneously, most effective assistants to the teacher. To those who are more backward they will endeavor to impart comprehension of their tasks, and they will frequently succeed in this better than the teacher himself, on account of the similarity of their mental processes. In this way there develops at an early age the distinction between natures born to lead and those requiring leadership. The former are spurred on to renewed zeal in their endeavors, and in proportion to their ability they may participate in influencing their little comrades in a useful and fruitful manner; the others learn at an early age that in their advancement they have need of the assistance of the better endowed ones, and, what is the best thing for all of them, they learn subordination and how to work in rank and file.

I must unfortunately forego explaining here all the excellent and elevating results which would ensue from such a really social development of our school system. I am not the first to express a thought of this kind; for in this direction, too, the instinctive pedagogical talent, which fortunately still seems relatively more abundant in us Germans than in other peoples, has indicated the right course to a few pioneer spirits. The conception of the school as a social organization is to-day no longer so strange as it seemed ten or twenty years ago, though a century ago a few leading students of pedagogy had already taken the same decisive point of view. But the application of scientific system to pedagogical problems gives us for the first time, so far as I can see, the sure scientific guaranty that in this direction the right course for the development of our school system is really indicated. Those things that were demanded by these idealistic pioneers in the realm of education, by reason of their instinctive

understanding of the child-soul and of the cultural needs of their time, by the application of basic sociological laws to the school problem are scientifically proved and systematically co-ordinated. Therefore our age no longer needs to be forced to wait till the right way is discovered by towering individual spirits endowed with the sureness of the sleep-walker in the dark: but it behooves rather the conscious scientific thought of the twentieth century to recognize and to follow a course that results from an exact and pertinent consideration of the facts, as the mature fruit of a philosophic grasp of all human knowledge.

WILHELM OSTWALD.



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THE BREVIARY OF ÆSTHETIC¹

I

"WHAT IS ART?"

IN reply to the question, "What is art?", it might be said jocosely (but this would not be a bad joke) that art is what everybody knows it to be. And indeed, if it were not to some extent known what it is, it would be impossible even to ask that question, for every question implies a certain knowledge of what is asked about, designated in the question and therefore known and qualified. A proof of this is to be found in the fact that we often hear expressed just and profound ideas in relation to art by those who make no profession of philosophy or of theory, by laymen, by artists who do not like to reason, by the ingenuous, and even by the common people: these ideas are sometimes implicit in judgments concerning particular works of art, but at others assume altogether the form of aphorisms and of definitions. Thus it happens that there arises the belief in the possibility of making blush, at will, any proud philosopher who should believe himself to have "discovered" the nature of art, by placing before his eyes or making ring in his ears propositions taken from the most superficial books or phrases of the most ordinary conversation, and shewing that they already most clearly contained his vaunted discovery.

And in this case the philosopher would have good reason to blush—that is, had he ever nourished the illusion of introducing into universal human consciousness, by means of his

¹ A lecture prepared for the inauguration of the Rice Institute, by Benedetto Croce, Senator of the Kingdom of Italy, Member of several Royal Commissions, Editor of "La Critica." Translated from the Italian by Douglas Ainslie, B.A. Oxon., of The Athenæum, London, England.

doctrines, something altogether original, something extraneous to this consciousness, the revelation of an altogether new world. But he does not blush, and continues upon his way, for he is not ignorant that the question as to what is art (as indeed every philosophical question as to the nature of the real, or in general every question of knowledge), even if by its use of language it seem to assume the aspect of a general and total problem, which it is claimed to solve for the first and last time, has always, as a matter of fact, a *circumscribed* meaning, referable to the particular difficulties that assume vitality at a determined moment in the history of thought. Certainly, truth does walk the streets, like the *esprit* of the well-known French proverb, or like metaphor, "queen of tropes" according to rhetoricians, which Montaigne discovered in the *babil* of his *chambrière*. But the metaphor used by the maid is the solution of a problem of expression proper to the feelings that affect the maid at that moment; and the obvious affirmations that by accident or intent one hears every day as to the nature of art, are solutions of logical problems, as they present themselves to this or that individual, who is not a philosopher by profession, and yet as man is also to some extent a philosopher. And as the maid's metaphor usually expresses but a small and vulgar world of feeling compared with that of the poet, so the obvious affirmation of one who is not a philosopher solves a problem small by comparison with that which occupies the philosopher. The answer as to what is art may appear similar in both cases, but is different in both cases owing to the different degree of richness of its intimate content; because the answer of the philosopher worthy of the name has neither more nor less than the task of solving in an adequate manner all the problems as to the nature of art that have arisen down to that moment in the course of history;

whereas that of the layman, since it revolves in a far narrower space, shews itself to be impotent outside those limits. Actual proof of this is also to be found in the force of the eternal Socratic method, in the facility with which the learned, by pressing home their questions, leave those without learning in open-mouthed confusion, though these had nevertheless begun by speaking well; but now finding themselves, in the course of the inquiry, in danger of losing what small knowledge they possessed, they have no resource but to retire into their shell, declaring that they do not like “subtleties.”

The philosopher's pride is solely based therefore upon the greater intensity of his questions and answers; a pride not unaccompanied with modesty—that is, with the consciousness that if his sphere be wider, or the largest possible, at a determined moment, yet it is limited by the history of that moment, and cannot pretend to a value of totality, or what is called a *definite* solution. The ulterior life of the spirit, renewing and multiplying problems, does not so much falsify, as render inadequate preceding solutions, part of them falling among the number of those truths that are understood, and part needing to be again taken up and integrated. A system is a house, which, as soon as it has been built and decorated, has need of continuous labour, more or less energetic, in order to keep it in repair (subject as it is to the corrosive action of the elements); and at a certain moment there is no longer any use in restoring and propping up the system, we must demolish and reconstruct it from top to bottom. But with this capital difference: that in the work of thought, the perpetually new house is perpetually maintained by the old one, which persists in it, almost by an act of magic. As we know, those superficial or ingenuous souls that are ignorant of this magic are terrified at it; so much so,

that one of their tiresome refrains against philosophy is that it continually undoes its work, and that one philosopher contradicts another: as though man did not always make and unmake his houses, and as though the architect that follows did not always contradict the architect that precedes; and as though it were possible to draw the conclusion from this making and unmaking of houses and from this contradiction among architects, that it is useless to make houses!

The answers of the philosopher, though they have the advantage of greater intensity, also carry with them the dangers of greater error, and are often vitiated by a sort of lack of good sense, which has an aristocratic character, in so far as it belongs to a superior sphere of culture, and even when meriting reproof, is the object not only of disdain and derision, but also of secret envy and admiration. This is the foundation of the contrast, that many delight to illustrate, between the mental equilibrium of ordinary people and the extravagances of philosophers; since, for example, it is clear that no man of good sense would have said that art is a reflexion of the sexual instinct, or that it is something maleficent and deserves to be banned from well-ordered republics. These absurdities have, however, been uttered by philosophers and even by great philosophers. But the innocence of the man of common sense is poverty, the innocence of the savage; and though there have often been sighs for the life of the savage, and a remedy has been called for to rescue good sense from philosophies, it remains a fact that the spirit, in its development, courageously affronts the dangers of civilisation and the momentary loss of good sense. The researches of the philosopher in relation to art must tread the paths of error in order to find the path of truth, which does not differ from, but is, those very paths of error which contain a clue to the labyrinth.

The close connection of error and truth arises from the fact that a complete and total error is inconceivable, and, since it is inconceivable, does not exist. Error speaks with two voices, one of which affirms the false, but the other denies it; it is a colliding of yes and no, which is called contradiction. Therefore, when we descend from general considerations to the examination of a theory that has been condemned as erroneous in its definite particulars, we find the cure in the theory itself—that is, the true theory, which grows out of the soil of error. Thus it happens that those very people who claim to reduce art to the sexual instinct, in order to demonstrate their thesis have recourse to arguments and meditations which, instead of uniting, separate art from that instinct; or that he who would expel poetry from the well-constituted republic, shudders in so doing, and himself creates a new and sublime poetry. There have been historical periods in which the most crude and perverted doctrines of art have dominated; yet this did not prevent the habitual and secure separation of the beautiful from the ugly at those periods, nor the very subtle discussion of the theme when the abstract theory was forgotten and particular cases were studied. Error is always condemned, not by the mouth of the judge, but *ex ore suo*.

Owing to this close connection with error, the affirmation of the truth is always a process of strife, by means of which it keeps freeing itself in error from error; whence arises another pious but impossible desire, namely, that which demands that truth should be directly exposed, without discussion or polemic; that it should be permitted to proceed majestically alone upon its way: as if this stage parade were the symbol suited to truth, which is thought itself, and, as thought, ever active and in labour. Indeed, nobody succeeds in exposing a truth, save by criticising the different solutions

of the problem with which it is connected; and there is no philosophical treatise, however weak, no little scholastic manual or academic dissertation, which does not collect at its beginning or contain in its body a review of opinions, historically given or ideally possible, which it wishes to oppose or to correct. This fact, though frequently realised in a capricious and disorderly manner, just expresses the legitimate desire to pass in review all the solutions that have been attempted in history or are possible of achievement in idea (that is, at the present moment, though always in history), in such a way that the new solution shall include in itself all the preceding labour of the human spirit.

But this demand is a *logical* demand, and as such intrinsic to every true thought and inseparable from it; and we must not confound it with a definite literary form of exposition, in order that we may not fall into the pedantry for which the scholastics of the Middle Ages and the dialecticians of the school of Hegel in the nineteenth century became celebrated, which is very closely connected with the formalistic superstition, and represents a belief in the marvellous virtue of a certain sort of extrinsic and mechanical philosophical exposition. We must, in short, understand it in a substantial, not in an accidental sense, respecting the spirit, not the letter, and proceed with freedom in the exposition of our own thought, according to time, place, and person. Thus, in these rapid lectures intended to provide as it were a guide to the right way of thinking out problems of art, I shall carefully refrain from narrating (as I have done elsewhere) the whole process of liberation from erroneous conceptions of art, mounting upwards from the poorest to the richest; and I shall cast far away, not from myself, but from my readers, a part of the baggage with which they will charge themselves when, prompted thereto by the sight of

the country passed over in our bird's flight, they shall set themselves to accomplish more particular voyages in this or that part of it, or to cross it again from end to end.

However, connecting the question which has given occasion to this indispensable prologue (indispensable for the purpose of removing from my discourse every appearance of pretentiousness, and also all blemish of inutility),—the question as to what is art,—I will say at once, in the simplest manner, that art is *vision* or *intuition*. The artist produces an image or a phantasm; and he who enjoys art turns his gaze upon the point to which the artist has pointed, looks through the chink which he has opened, and reproduces that image in himself. “Intuition,” “vision,” “contemplation,” “imagination,” “fancy,” “figurations,” “representations,” and so on, are words continually recurring, like synonyms, when discoursing upon art, and they all lead the mind to the same conceptual sphere which indicates general agreement.

But this reply, that art is intuition, obtains its force and meaning from all that it implicitly denies and from which it distinguishes art. What negations are implicit in it? I shall indicate the principal, or at least those that are the most important for us at this present moment of our culture.

It denies, above all, that art is a *physical fact*: for example, certain determined colours, or relations of colours; certain definite forms of bodies; certain definite sounds, or relations of sounds; certain phenomena of heat or of electricity—in short, whatsoever be designated as “physical.” The inclination toward this error of physicising art is already present in ordinary thought, and as children who touch the soap-bubble and would wish to touch the rainbow, so the human spirit, admiring beautiful things, hastens spontaneously to trace out the reasons for them in external nature, and proves that it must think, or believes that it

should think, certain colours beautiful and certain other colours ugly, certain forms beautiful and certain other forms ugly. But this attempt has been carried out intentionally and with method on several occasions in the history of thought: from the "canons" which the Greek theoreticians and artists fixed for the beauty of bodies, through the speculations as to the geometrical and numerical relations of figures and sounds, down to the researches of the æstheticians of the nineteenth century (Fechner, for example), and to the "communications" presented in our day by the inexpert, at philosophical, psychological, and natural science congresses, concerning the relations of physical phenomena with art. And if it be asked why art cannot be a physical fact, we must reply, in the first place, that physical facts *do not possess reality*, and that art, to which so many devote their whole lives and which fills all with a divine joy, is *supremely real*; thus it cannot be a physical fact, which is something unreal. This sounds at first paradoxical, for nothing seems more solid and secure to the ordinary man than the physical world; but we, in the seat of truth, must not abstain from the good reason and substitute for it one less good, solely because the first should have the appearance of a lie; and besides, in order to surpass what of strange and difficult may be contained in that truth, to become at home with it, we may take into consideration the fact that the demonstration of the unreality of the physical world has not only been proved in an indisputable manner and is admitted by all philosophers (who are not crass materialists and are not involved in the strident contradictions of materialism), but is professed by these same physicists in the spontaneous philosophy which they mingle with their physics, when they conceive physical phenomena as products of principles that are beyond experience, of atoms or of ether,

or as the manifestation of an Unknowable: besides, the matter itself of the materialists is a supermaterial principle. Thus physical facts reveal themselves, by their internal logic and by common consent, not as reality, but as a *construction of our intellect for the purposes of science*. Consequently, the question whether art be a physical fact must rationally assume this different signification: that is to say, *whether it be possible to construct art physically*. And this is certainly possible, for we indeed carry it out always, when, turning from the sense of a poem and ceasing to enjoy it, we set ourselves, for example, to count the words of which the poem is composed and to divide them into syllables and letters; or, disregarding the æsthetic effect of a statue, we weigh and measure it: a most useful performance for the packers of statues, as is the other for the typographers who have to “compose” pages of poetry; but most useless for the contemplator and student of art, to whom it is neither useful nor licit to allow himself to be “distracted” from his proper object. Thus art is not a physical fact in this second sense, either; which amounts to saying that when we propose to ourselves to penetrate its nature and mode of action, to construct it physically is of no avail.

Another negation is implied in the definition of art as intuition: if it be intuition, and intuition is equivalent to *theory* in the original sense of contemplation, art cannot be a utilitarian act; and since a utilitarian act aims always at obtaining a pleasure and therefore at keeping off a pain, art, considered in its own nature, has nothing to do with the *useful* and with *pleasure* and *pain*, as such. It will be admitted, indeed, without much difficulty, that a pleasure as a pleasure, any sort of pleasure, is not of itself artistic; the pleasure of a drink of water that slakes thirst, or a walk in the open air that stretches our limbs and makes our blood

circulate more lightly, or the obtaining of a longed-for post that settles us in practical life, and so on, is not artistic. Finally, the difference between pleasure and art leaps to the eyes in the relations that are developed between ourselves and works of art, because the figure represented may be dear to us and represent the most delightful memories, and at the same time the picture may be ugly; or, on the other hand, the picture may be beautiful and the figure represented hateful to our hearts, or the picture itself, which we approve as beautiful, may also cause us rage and envy, because it is the work of our enemy or rival, for whom it will procure advantage and on whom it will confer new strength: our practical interests, with their relative pleasures and pains, mingle and sometimes become confused with art and disturb, but are never *identified* with, our æsthetic interest. At the most it will be affirmed, with a view to maintaining more effectively the definition of art as the pleasurable, that it is not the pleasurable in general, but a *particular* form of the pleasurable. But such a restriction is no longer a defence, it is indeed an abandonment of that thesis; for given that art is a particular form of pleasure, its distinctive character would be supplied, not by the pleasurable, but by what distinguishes that pleasurable from other pleasurable, and it would be desirable to turn the attention to that distinctive element—more than pleasurable or different from pleasurable. Nevertheless, the doctrine that defines art as the pleasurable has a special denomination (hedonistic æsthetic), and a long and complicated development in the history of æsthetic doctrines: it shewed itself in the Græco-Roman world, prevailed in the eighteenth century, reflowered in the second half of the nineteenth, and still enjoys much favour, being especially well received by beginners in æsthetic, who are above all struck by the fact that art causes pleasure. The life of this

doctrine has consisted of proposing in turn one or another class of pleasures, or several classes together (the pleasure of the superior senses, the pleasure of play, of consciousness of our own strength, of criticism, etc., etc.), or of adding to it elements differing from the pleasurable, the useful for example (when understood as distinct from the pleasurable), the satisfaction of cognoscitive and moral wants, and the like. And its progress has been caused just by this restlessness, and by its allowing foreign elements to ferment in its bosom, which it introduces through the necessity of somehow bringing itself into agreement with the reality of art, thus attaining to its dissolution as hedonistic doctrine and to the promotion of a new doctrine, or at least to drawing attention to its necessity. And since every error has its element of truth (and that of the physical doctrine has been seen to be the possibility of the physical “construction” of art as of any other fact), the hedonistic doctrine has its eternal element of truth in the placing in relief the hedonistic accompaniment, or pleasure, common to the æsthetic activity as to every form of spiritual activity, which it has not at all been intended to deny in absolutely denying the identification of art with the pleasurable, and in distinguishing it from the pleasurable by defining it as intuition.

A third negation, effected by means of the theory of art as intuition, is that art is a *moral act*; that is to say, that form of practical act which, although necessarily uniting with the useful and with pleasure and pain, is not immediately utilitarian and hedonistic, and moves in a superior spiritual sphere. But the intuition, in so far as it is a theoretic act, is opposed to the practical of any sort. And in truth, art, as has been remarked from the earliest times, does not arise as an act of the will; good will, which constitutes the honest man, does not constitute the artist. And since it is not the result of an

act of will, so it escapes all moral discrimination, not because a privilege of exemption is accorded to it, but simply because moral discrimination cannot be applied to art. An artistic image portrays an act morally praiseworthy or blameworthy; but this image, as image, is neither morally praiseworthy nor blameworthy. Not only is there no penal code that can condemn an image to prison or to death, but no moral judgment, uttered by a rational person, can make of it its object: we might just as well judge the square moral or the triangle immoral as the Francesca of Dante immoral or the Cordelia of Shakespeare moral, for these have a purely artistic function, they are like musical notes in the souls of Dante and of Shakespeare. Further, the moralistic theory of art is also represented in the history of æsthetic doctrines, though much discredited in the common opinion of our times, not only on account of its intrinsic demerit, but also, in some measure, owing to the moral demerit of certain tendencies of our times, which render possible, owing to psychological dislike, that refutation of it which should be made—and which we here make—solely for logical reasons. The end attributed to art, of directing the good and inspiring horror of evil, of correcting and ameliorating customs, is a derivation of the moralistic doctrine; and so is the demand addressed to artists to collaborate in the education of the lower classes, in the strengthening of the national or bellicose spirit of a people, in the diffusion of the ideals of a modest and laborious life; and so on. These are all things that art cannot do, any more than geometry, which, however, does not lose anything of its importance on account of its inability to do this; and one does not see why art should do so, either. That it cannot do these things was partially perceived by the moralistic æstheticians also; who very readily effected a transaction with it, permitting it to provide pleasures that

were not moral, provided they were not openly dishonest, or recommending it to employ to a good end the dominion that, owing to its hedonistic power, it possessed over souls, to gild the pill, to sprinkle sweetness upon the rim of the glass containing the bitter draught—in short, to play the courtesan (since it could not get rid of its old and inborn habits), in the service of holy church or of morality: *meretrix ecclesiæ*. On other occasions they have sought to avail themselves of it for purposes of instruction, since not only virtue but also science is a difficult thing, and art could remove this difficulty and render pleasant and attractive the entrance into the ocean of science—indeed, lead them through it as through a garden of Armida, gaily and voluptuously, without their being conscious of the lofty protection they had obtained, or of the crisis of renovation which they were preparing for themselves. We cannot now refrain from a smile when we talk of these theories, but should not forget that they were once a serious matter corresponding to a serious effort to understand the nature of art and to elevate the conception of it; and that among those who believed in it (to limit ourselves to Italian literature) were Dante and Tasso, Parini and Alfieri, Manzoni and Mazzini. And the moralistic doctrine of art was and is and will be perpetually beneficial by its very contradictions; it was and will be an effort, however unhappy, to separate art from the merely pleasing, with which it is sometimes confused, and to assign to it a more worthy post: and it, too, has its true side, because, if art be beyond morality, the artist is neither this side of it nor that, but under its empire, in so far as he is a man who cannot withdraw himself from the duties of man, and must look upon art itself—art, which is not and never will be moral—as a mission to be exercised as a priestly office.

Again (and this is the last and perhaps the most important of all the general negations that it suits me to recall in relation to this matter), with the definition of art as intuition, we deny that it has the character of *conceptual knowledge*. Conceptual knowledge, in its true form, which is the philosophical, is always realistic, aiming at establishing reality against unreality, or at lowering unreality by including it in reality as a subordinate moment of reality itself. But intuition means, precisely, indistinction of reality and unreality, the image with its value as mere image, the pure ideality of the image; and opposing the intuitive or sensible knowledge to the conceptual or intelligible, the æsthetic to the noetic, it aims at claiming the autonomy of this more simple and elementary form of knowledge, which has been compared to the dream (the dream, and not the sleep) of the theoretic life, in respect to which philosophy would be the waking. And indeed, whoever should ask, when examining a work of art, whether what the artist has expressed be metaphysically and historically true or false, asks a question that is without meaning, and commits an error analogous to his who should bring the airy images of the fancy before the tribunal of morality: without meaning, because the discrimination of true and false always concerns an affirmation of reality, or a judgment, but it cannot fall under the head of an image or of a pure subject, which is not the subject of a judgment, since it is without qualification or predicate. It is useless to object that the individuality of the image cannot subsist without reference to the universal, of which that image is the individuation, because we do not here deny that the universal, as the spirit of God, is everywhere and animates all things with itself, but we deny that the universal is rendered logically explicit and is thought in the intuition. Useless also is the appeal to the principle

of the unity of the spirit, which is not broken, but, on the contrary, strengthened by the clear distinction of fancy from thought, because from the distinction comes opposition, and from opposition concrete unity.

Ideality (as has also been called this character that distinguishes the intuition from the concept, art from philosophy and from history, from the affirmation of the universal and from the perception or narration of what has happened) is the intimate virtue of art: no sooner are reflection and judgment developed from that ideality, than art is dissipated and dies: it dies in the artist, who becomes a critic; it dies in the contemplator, who changes from an entranced enjoyer of art to a meditative observer of life.

But the distinction of art from philosophy (taken widely as including all thinking of the real) brings with it other distinctions, among which that of art from *myth* occupies the foremost place. For myth, to him who believes in it, presents itself as the revelation and knowledge of reality as opposed to unreality,—a reality that drives away other beliefs as illusory or false. It can become art only for him who no longer believes in it and avails himself of mythology as a metaphor, of the austere world of the gods as of a beautiful world, of God as of an image of sublimity. Considered, then, in its genuine reality, in the soul of the believer and not of the unbeliever, it is religion and not simple fancy; and religion is philosophy, philosophy in process of becoming, philosophy more or less imperfect, but philosophy, as philosophy is religion, more or less purified and elaborated, in continuous process of elaboration and purification, but religion or thought of the Absolute or Eternal. Art lacks the thought that is necessary ere it can become myth and religion, and the faith that is born of thought; the artist neither believes nor disbelieves in his image: he produces

it. And, for a different reason, the concept of art as intuition excludes, on the other hand, the conception of art as the production of *classes and types, species and genera*, or again (as a great mathematician and philosopher had occasion to say of music), as an exercise of unconscious *arithmetic*; that is, it distinguishes art from the positive sciences and from mathematics, in both of which appears the conceptual form, though without realistic character, as mere general representation or mere abstraction. But that idealism which natural and mathematical science would seem to assume, as opposed to the world of philosophy, of religion and of history, and which would seem to approximate it to art (and owing to which scientists and mathematicians of our day are so ready to boast of creating worlds, of *fictiones*, resembling the fictions and figurations of the poets, even in their vocabulary), is gained with the renunciation of concrete thought, by means of generalisation and abstraction, which are capricious, volitional decisions, practical acts, and, as practical acts, extraneous and inimical to the world of art. Thus it happens that art manifests much more repugnance toward the positive and mathematical sciences than toward philosophy, religion and history, because these seem to it to be fellow-citizens of the same world of theory or of knowledge, whereas those others shock it with the brutality toward contemplation of the practical world. Poetry and classification, and, worse still, poetry and mathematics, appear to be as little in agreement as fire and water: the *esprit mathématique* and the *esprit scientifique*, the most declared enemies of the *esprit poétique*; those periods in which the natural sciences and mathematics prevail (for example, the intellectualism of the eighteenth century) seem to be the least fruitful in poetry.

And since this vindication of the alogical character of art

is, as I have said, the most difficult and important of the negations included in the formula of art-intuition, the theories that attempt to explain art as philosophy, as religion, as history, or as science, and in a lesser degree as mathematics, occupy the greater part of the history of æsthetic science and are adorned with the names of the greatest philosophers. Schelling and Hegel afford examples of the identification or confusion of art with religion and philosophy in the eighteenth century; Taine, of its confusion with the natural sciences; the theories of the French verists, of its confusion with historical and documentary observation; the formalism of the Herbartians, of its confusion with mathematics. But it would be vain to seek pure examples of these errors in any of these authors and in the others that might be mentioned, because error is never pure, for if it were so, it would be truth. Thus the doctrines of art that for the sake of brevity I shall term “conceptualistic” contain elements of dissolution, the more copious and efficacious by as much as the spirit of the philosopher who professed them was energetic, and therefore nowhere are they so copious and efficacious as in Schelling and Hegel, who thus had so lively a consciousness of artistic production as to suggest by their observations and their particular developments a theory opposed to that maintained in their systems. Furthermore, the very conceptualistic theories are superior to the others previously examined, not only in so far as they recognise the *theoretic* character of art, but also carry with them their contribution to the true doctrine, owing to the claim that they make for a determination of the relations (which, if they be of distinction, are also of unity) between fancy and logic, between art and thought.

And here we can already see how the simplest formula, that “art is intuition,”—which, translated into other sym-

bolical terms (for example, that "art is the work of fancy"), is to be found in the mouths of all those who daily discuss art, and is to be found in older terms ("imitation," "fiction," "fable," etc.) in so many old books,—pronounced now in the text of a philosophical discourse, becomes filled with a historical, critical, and polemical content, of which I can hardly here give any example. And it will no longer cause astonishment that its philosophical conquest should have cost an especially great amount of toil, because that conquest is like setting foot upon a little hill long fought for in battle. Its easy ascent by the thoughtless pedestrian in time of peace is a very different matter; it is not a simple resting-place on a walk, but the symbol and result of the victory of an army. The historian of æsthetic follows the steps of its difficult progress, in which (and this is another magical act of thought) the conqueror, instead of losing strength through the blows that his adversary inflicts upon him, acquires new strength through these very blows, and reaches the sighed-for eminence, repulsing his adversary, and yet in his company. Here I cannot do more than record in passing the importance of the Aristotelian concept of *mimesis* (arising in opposition to the Platonic condemnation of poetry), and the attempt made by the same philosopher to distinguish *poetry* and *history*: a concept that was not sufficiently developed, and perhaps not altogether mature in his mind, and therefore long misunderstood, but which was yet to serve, after many centuries, as the point of departure for modern æsthetic thought. And I will mention in passing the ever-increasing consciousness of the difference between *logic* and *fancy*, between *judgment* and *taste*, between *intellect* and *genius*, which became ever more lively during the course of the seventeenth century, and the solemn form which the contest between *Poetry* and *Metaphysic* assumed in the "Scienza

Nuova" of Vico; and also the scholastic construction of an *Æsthetica*, distinct from a *Logica*, as *Gnoseologia inferior* and *Scientia cognitionis sensitivæ*, in Baumgarten, who, however, remained involved in the conceptualistic conception of art, and did not carry out his project; and the Critique of Kant directed against Baumgarten and all the Leibnitzians and Wolffians, which made it clear that intuition is intuition and not a "confused concept"; and romanticism, which perhaps better developed the new idea of art, announced by Vico, in its artistic criticism and in its histories than in its systems; and, finally, the criticism inaugurated in Italy by Francesco de Sanctis, who caused art as pure *form*, or pure intuition, to prevail over all utilitarianism, moralism, and conceptualism (to adopt his vocabulary).

But doubt springs up at the feet of truth, "like a young shoot,"—as the *terzina* of father Dante has it,—doubt, which is what drives the intellect of man "from mount to mount." The doctrine of art as intuition, as fancy, as form, now gives rise to an ulterior (I have not said an "ultimate") problem, which is no longer one of opposition and distinction toward physics, hedonistic, ethic and logic, but the field of images itself, which sets in doubt the capacity of the image to define the character of art and is in reality occupied with the mode of separating the genuine from the spurious image, and of enriching in this way the concept of the image and of art. What function (it is asked) can a world of pure images possess in the spirit of man, without philosophical, historical, religious or scientific value, and without even moral or hedonistic value? What is more vain than to dream with open eyes in life, which demands, not only open eyes, but an open mind and a nimble spirit? Pure images! But to nourish oneself upon pure images is called by a name of little honour, "to dream," and there is usually added to

this the epithet of "idle." It is a very insipid and inconclusive thing; can it ever be art? Certainly, we sometimes amuse ourselves with the reading of some sensational romance of adventure, where images follow images in the most various and unexpected way; but we thus enjoy ourselves in moments of fatigue, when we are obliged to kill time, and with a full consciousness that such stuff is not art. Such instances are of the nature of a pastime, a game; but were art a game or a pastime, it would fall into the wide arms of hedonistic doctrine, ever open to receive it. And it is a utilitarian and hedonistic need that impels us sometimes to relax the bow of the mind and the bow of the will, and to stretch ourselves, allowing images to follow one another in our memory, or combining them in quaint forms with the aid of the imagination, in a sort of waking sleep, from which we rouse ourselves as soon as we are rested; and we sometimes rouse ourselves just to devote ourselves to the work of art, which cannot be produced by a mind relaxed. Thus either art is not pure intuition, and the claims put forward in the doctrines which we believed we had above confuted, are not satisfied, and so the confutation itself of these doctrines is troubled with doubts; or intuition cannot consist in a simple act of imagination.

In order to render the problem more exact and more difficult, it will be well to eliminate from it at once that part to which the answer is easy, and which I have not wished to neglect, precisely because it is usually united and confused with it. The intuition is the product of an image, and not of an incoherent mass of images obtained by recalling former images and allowing them to succeed one another capriciously, by combining one image with another in a like capricious manner, joining a horse's neck to a human head, and thus playing a childish game. Old Poetic availed itself

above all of the concept of *unity*, in order to express this distinction between the intuition and imagining, insisting that whatever the artistic work, it should be *simplex et unum*; or of the allied concept of *unity in variety*—that is to say, the multiple images were to find their common centre unit of union in a comprehensive image: and the æsthetic of the nineteenth century created with the same object the distinction, which appears in not a few of its philosophers, between *fancy* (the peculiar artistic faculty) and *imagination* (the extra-artistic faculty). To amass, select, cut up, combine images, presupposes the possession of particular images in the spirit; and fancy produces, whereas imagination is sterile, adapted to extrinsic combinations and not to the generation of organism and life. The most profound problem, contained beneath the rather superficial formula with which I first presented it, is, then: What is the office of the pure image in the life of the spirit? or (which at bottom amounts to the same thing), How does the pure image come into existence? Every inspired work of art gives rise to a long series of imitators, who just repeat, cut up in pieces, combine, and mechanically exaggerate that work, and by so doing play the part of imagination toward or against the fancy. But what is the justification, or what the genesis, of the work of genius, which is afterward submitted (a sign of glory!) to such torments? In order to make this point clear, we must go deeply into the character of fancy or pure intuition.

And the best way to prepare this deeper study is to recall to mind and to criticise the theories with which it has been sought to differentiate artistic intuition from merely incoherent imagination (while taking care not to fall into realism or conceptualism), to establish in what the principle of unity consists, and to justify the productive character of the

fancy. The artistic image (it has been said) is such, when it unites the intelligible with the sensible, and represents an idea. Now "intelligible" and "idea" cannot mean anything but concept (nor has it a different meaning with those who maintain this doctrine); even though it be the concrete concept or idea, proper to lofty philosophical speculation, which differs from the abstract concept or from the representative concept of the sciences. But in any case, the concept or idea always unites the intelligible to the sensible, and not only in art, for the new concept of the concept, first stated by Kant and (so to speak) immanent in all modern thought, heals the breach between the sensible and the intelligible worlds, conceives the concept as judgment, and the judgment as synthesis *a priori*, and the synthesis *a priori* as the word become flesh, as history. Thus that definition of art leads the fancy back to logic and art to philosophy, contrary to intention; and is at most valid for the abstract conception of science, not for the problem of art (the æsthetic and teleological "Critique of Judgment" of Kant had precisely this historical function of correcting what of abstract there yet remained in the "Critique of Pure Reason"). To seek a sensible element for the concept, beyond that which it has already absorbed in itself as concrete concept, and beyond the words in which it expresses itself, would be superfluous. If we persist in this search, it is true that we abandon the conception of art as philosophy or history, but only to pass to the conception of art as *allegory*. And the unsurmountable difficulties of the allegory are well known, as its frigid and anti-historical character is known and universally felt. Allegory is the extrinsic union, the conventional and arbitrary juxtaposition of two spiritual acts, a concept or thought and an image, where it is assumed that this image must represent that concept. And not only is the individual char-

acter of the artistic image not explained by this, but, in addition, a duality is purposely created, because thought remains thought and image image in this juxtaposition, without relation between themselves; so much so, that in contemplating the image, we forget the concept without any disadvantage,—indeed, with advantage,—and in thinking the concept, we dissipate, also with advantage, the superfluous and tiresome image. Allegory enjoyed much favour in the Middle Ages, that mixture of Germanism and Romanism, of barbarism and culture, of bold fancy and of acute reflection; but it was the theoretic element in, and not the effective reality of, the same mediæval art which, where it is art, drives allegory away from or resolves it in itself. This need for the solution of allegorical dualism leads to the refining of the theory of intuition, in so far as it is allegory of the idea, into the other theory, of the intuition as—*symbol*; for the idea does not stand by itself in the symbol, thinkable separately from the symbolising representation, nor does the symbol stand by itself, representable in a lively manner without the idea symbolised. The idea is all reduced to representation (as said the æsthetician Vischer, if to anyone belongs the blame of the very prosaic comparison for so poetic and metaphysical a theme), like a lump of sugar melted in a glass of water, which exists and acts in every molecule of water, but is no longer to be found as a lump of sugar. But the idea that has disappeared, the idea that has become entirely representative, the idea that we can no longer succeed in seizing as idea (save by extracting it, like sugar from sugared water), is no longer idea, and is only the sign that the unity of the artistic image has not yet been achieved. Certainly art is symbol, all symbol—that is, all significant; but symbol of what? What does it mean? The intuition is truly artistic, it is truly intuition, and not a chaotic mass of

images, only when it has a vital principle that animates it, making it all one with itself; but what is this principle?

The answer to such a question may be said to result from the examination of the greatest ideal strife that has ever taken place in the field of art (and is not confined to the epoch that took its name from it and in which it was predominant): the strife between *romanticism* and *classicism*. Giving the general definition, here convenient, and setting aside minor and accidental determinations, romanticism asks of art, above all, the spontaneous and violent effusion of the affections, of love and hate, of anguish and jubilation, of desperation and elevation; and is willingly satisfied and pleased with vaporous and indeterminate images, broken and allusive in style, with vague suggestions, with approximate phrases, with powerful and troubled sketches: while classicism loves the peaceful soul, the wise design, figures studied in their characteristics and precise in outline, ponderation, equilibrium, clarity; and resolutely tends toward *representation*, as the other tends toward *feeling*. And whoever puts himself at one or the other point of view finds crowds of reasons for maintaining it and for confuting the opposite point of view; because (say the romantics), What is the use of an art, rich in beautiful images, which, nevertheless, does not speak to the heart? And if it do speak to the heart, what is the use if the images be not beautiful? And the others will say, What is the use of the shock of the passions, if the spirit do not rest upon a beautiful image? And if the image be beautiful, if our taste be satisfied, what matters the absence of those emotions which can all of them be obtained outside art, and which life does not fail to provide, sometimes in greater quantity than we desire?—But when we begin to feel weary of the fruitless defence of both partial views; above all, when we turn

away from the ordinary works of art produced by the romantic and classical schools, from works convulsed with passion or coldly decorous, and fix them on the works, not of the disciples, but of the masters, not of the mediocre, but of the supreme, we see the contest disappear in the distance and find ourselves unable to call the great portions of these works, romantic or classic or representative, because they are both classic and romantic, feelings and representations, a vigorous feeling which has become all most brilliant representation. Such, for example, are the works of Hellenic art, and such those of Italian poetry and art: the transcendentalism of the Middle Ages became fixed in the bronze of the Dantesque *terzina*; melancholy and suave fancy, in the transparency of the songs and sonnets of Petrarch; sage experience of life and badinage with the fables of the past, in the limpid *ottava rima* of Ariosto; heroism and the thought of death, in the perfect blank-verse hendecasyllabics of Foscolo; the infinite variety of everything, in the sober and austere songs of Giacomo Leopardi. Finally (be it said in parenthesis and without intending comparison with the other examples adduced), the voluptuous refinements and animal sensuality of international decadentism have received their most perfect expression in the prose and verse of an Italian, D'Annunzio. All these souls were profoundly passionate (all, even the serene Lodovico Ariosto, who was so amorous, so tender, and so often represses his emotion with a smile); their works of art are the eternal flower that springs from their passions.

These expressions and these critical judgments can be theoretically resumed in the formula, that what gives coherence and unity to the intuition is feeling: the intuition is really such because it represents a feeling, and can only appear from and upon that. Not the idea, but the feeling, is

what confers upon art the airy lightness of the symbol: an aspiration enclosed in the circle of a representation—that is art; and in it the aspiration alone stands for the representation, and the representation alone for the aspiration. Epic and lyric, or drama and lyric, are scholastic divisions of the indivisible: art is always lyrical—that is, epic and dramatic in feeling. What we admire in genuine works of art is the perfect fanciful form which a state of the soul assumes; and we call this life, unity, solidity of the work of art. What displeases us in the false and imperfect forms is the struggle of several different states of the soul not yet unified, their stratification, or mixture, their vacillating method, which obtains apparent unity from the will of the author, who for this purpose avails himself of an abstract plan or idea, or of extra-æsthetic, passionate emotion. A series of images which seem to be, each in turn, rich in power of conviction, leaves us nevertheless deluded and diffident, because we do not see them generated from a state of the soul, from a “sketch” (as the painters call it), from a motive; and they follow one another and crowd together without that precise intonation, without that accent, which comes from the heart. And what is the figure cut out from the background of the picture or transported and placed against another background, what is the personage of drama or of romance outside his relation with all the other personages and with the general action? And what is the value of this general action if it be not an action of the spirit of the author? The secular disputes concerning dramatic unity are interesting in this connection; they are first applied to the unity of “action” when they have been obtained from an extrinsic determination of time and place, and this finally applied to the unity of “interest,” and the interest would have to be in its turn dissolved in the interest of the spirit of

the poet—that is, in his intimate aspiration, in his feeling. The negative issue of the great dispute between classicists and romanticists is interesting, for it resulted in the negation both of the art which strives to distract and illude the soul as to the deficiency of the image with mere feeling, with the practical violence of feeling, with feeling that has not become contemplation, and of the art which, by means of the superficial clearness of the image, of drawing correctly false, of the word falsely correct, seeks to deceive as to its lack of inspiration and its lack of an æsthetic reason to justify what it has produced. A celebrated sentence uttered by an English critic, and become one of the commonplaces of journalism, states that “all the arts tend to the condition of music”; but it would have been more accurate to say that all the arts are music, if it be thus intended to emphasise the genesis of æsthetic images in feeling, excluding from their number those mechanically constructed or realistically ponderous. And another not less celebrated utterance of a Swiss semi-philosopher, which has had the like good or bad fortune of becoming trivial, discovers that “every landscape is a state of the soul”: which is indisputable, not because the landscape is landscape, but because the landscape is art.

Artistic intuition, then, is always *lyrical* intuition: this latter being a word that is not present as an adjective or definition of the first, but as a synonym, another of the synonyms that can be united to the several that I have mentioned already, and which, all of them, designate the intuition. And if it be sometimes convenient that instead of appearing as a synonym, it should assume the grammatical form of the adjective, that is only to make clear the difference between the intuition-image, or nexus of images (for what is called image is always a nexus of images, since image-atoms do not exist any more than thought-atoms), which

constitutes the organism, and, as organism, has its vital principle, which is the organism itself,—between this, which is true and proper intuition, and that false intuition which is a heap of images put together in play or intentionally or for some other practical purpose, the connection of which, being practical, shows itself to be not organic, but mechanic, when considered from the æsthetic point of view. But the word *lyric* would be redundant save in this explicative or polemical sense; and art is perfectly defined when it is simply defined as *intuition*.

II

PREJUDICES RELATING TO ART

THERE can be no doubt that the process of distinction of art from the facts and the acts with which it has been and is confused, which I have summarily traced, necessitates no small mental effort; but this effort is rewarded with the freedom which it affords of handling the many fallacious distinctions which disfigure the field of æsthetic. These, although they do not present any difficulty in thinking out (indeed, at first they seduce by their very facility and deceitful self-evidence), yet imply the other and greater annoyance of preventing all profound understanding, and indeed of making it impossible to understand anything as to what art truly is. It is true that many people, in order to retain the power of repeating vulgar and traditional distinctions, voluntarily resign themselves to this ignorance. We, on the contrary, now prefer to throw them all away, as a useless hindrance in the new task to which the new theoretic position that we have attained invites and leads us, and to enjoy the greater facility which comes from feeling rich. Wealth is not only to be obtained by acquiring many objects, but, on the contrary, by getting rid of all those that represent economic debt.

Let us begin with the most famous of these economic debts in the circle of æsthetic: the distinction between *content* and *form*, which has caused a division of schools even in the nineteenth century: the schools of the æsthetic of the content (*Gehaltsæsthetik*) and that of the æsthetic of form (*Formæsthetik*). The problems from which these

opposed schools arose were, in general, the following: Does art consist solely of the content, or solely of the form, or of content and form together? What is the character of the content, what that of the æsthetic form?—It was answered, on the one hand, that art, the essence of art, is all contained in the content, defined as that which pleases, or as what is moral, or as what raises man to the heaven of religion or of metaphysic, or as what is historically correct, or, finally, as what is naturally and physically beautiful. And, on the other hand, that the content is indifferent, that it is simply a peg or hook from which beautiful forms are suspended, which alone beatify the æsthetic spirit: unity, harmony, symmetry, and so on. And on both sides it was attempted to attract the element that had previously been excluded from the essence of art as subordinate and secondary: those for the content admitted that it was an advantage to the content (which, according to them, was really the constitutive element of the beautiful) to adorn itself with beautiful forms also, and to present itself as unity, symmetry, harmony, etc.; and the formalists, in their turn, admitted that if art did not gain by the value of its content, its effect did, not a single value, but the sum of two values being in this case offered. These doctrines, which attained their greatest scholastic bulk in Germany with the Hegelians and the Herbartians, is also to be found more or less everywhere in the history of æsthetic, ancient, mediæval, modern, and most modern; and is what amounts to most in common opinion, for nothing is more common than to hear that a drama is beautiful in “form,” but a failure in “content”; that a poem is “most nobly” conceived, but “executed in ugly verse”; that a painter would have been greater did he not waste his power as a designer and as a colourist, upon “small and unworthy themes,” instead of selecting, on the contrary, those

of a historical, patriotic, or sociological character. It may be said that fine taste and true critical sense of art have to defend themselves at every step against the perversions of judgment arising from these doctrines, in which philosophers become the crowd, and the crowd feels itself philosophical, because in agreement with those crowd-philosophers. The origin of these theories is no secret for us, because, even in the brief sketch that we have given, it is quite clear that they have sprung from the trunk of hedonistic, moralistic, conceptualistic, or physical conceptions of art: they are all doctrines which, failing to perceive what makes art art, were obliged somehow to regain art, which they had allowed to escape them, and to reintroduce it in the form of an accessory or accidental element; the upholders of the theory of the content conceived it as an abstract formal element, the formalists as the abstract element of the content. What interests us in those æsthetics is just this dialectic, in which the theorists of the content become formalists against their will, and the formalists upholders of the theory of the content; thus each passes over to occupy the other's place, but to be restless there and to return to their own, which gives rise to the same restlessness. The "beautiful forms" of Herbart do not differ in any way from the "beautiful contents" of the Hegelians, because both are nothing. And we become yet more interested to observe their efforts, to get out of prison, and the blows with which they weaken its doors or its walls, and the air-holes which some of those thinkers succeed in opening.—Their efforts are clumsy and sterile, like those of the theorists of the content (they are to be seen in a repulsive form in the *Philosophie des Schönen* of Hartmann), who, by adding stitch to stitch, composed a net of "beautiful contents" (beautiful, sublime, comic, tragic, humouristic, pathetic, idyllic, sentimental, etc., etc.),

in which very coarse net they tried to enclose every form of reality, even that which they had called "ugly." They failed to perceive that their æsthetic content, thus made to enclose little by little the whole of reality, has no longer any character that distinguishes it from other contents, since there is no content beyond reality; and that therefore their fundamental theory was thus fundamentally negated. These contradictory and ingenuous explosions resemble those of other formalistic theorists of the content who maintained the concept of an æsthetic content, but defined it as that "which interests man," and made the interest relating to man to lie in his different historical situations—that is, relative to the individual. This was another way of denying the initial assumption, for it is very clear that the artist would not produce art, did he not interest himself in something which is the datum or the problem of his production, but that this something becomes art only because the artist, by becoming interested in it, makes it so.—These are evasions of formalists, who after having limited art to abstract beautiful forms, void of all content and only to be summed up with contents, timidly introduced among beautiful forms that of the harmony of content with form; or more resolutely declared themselves partisans of a sort of eclecticism, which makes art to consist of a sort of "relation" of the beautiful content with the beautiful form, and, with an incorrectness worthy of eclectics, attributed to terms outside the relation qualities which they assume only within the relation.

For the truth is really this: content and form must be clearly distinguished in art, but must not be separately qualified as artistic, precisely because their relation only is artistic—that is, their unity, understood not as an abstract, dead unity, but as concrete and living, which is that of the synthesis *a priori*; and art is a true *æsthetic synthesis a priori* of feeling

and image in the intuition, as to which it may be repeated that feeling without image is blind, and image without feeling is void. Feeling and image do not exist for the artistic spirit outside the synthesis; they will have existence from another point of view in another plane of knowledge, and feeling will be the practical aspect of the spirit that loves and hates, desires and dislikes, and the image will be the inanimate residue of art, the withered leaf, prey of the wind of imagination and of amusement's caprice. All this has no concern with the artist or the æsthetician: just as art is no vain fancying, so is it not tumultuous passionality, but the uplifting of that act by means of another act, or, if it be preferred, the substitution of that tumult for another tumult, that of the longing to create and to contemplate for the joys and the sorrows of artistic creation. It is therefore indifferent, or a question of terminological opportunity, whether we should present art as content or as form, provided it be always recognised that the content is formed and the form filled, that feeling is figurative feeling and the figure a figure that is felt. And it is only owing to historical deference toward him who better than others caused the concept of the autonomy of art to be appreciated, and wished to affirm this autonomy with the word "form," thus opposing alike the abstract theory of the content of the philosophisers and moralists and the abstract formalism of the academicians,—in deference, I say, to De Sanctis, and also because of the ever active polemic against the attempts to absorb art in other modes of spiritual activity,—that the æsthetic of the intuition can be called "*Æsthetic of form.*" It is useless to refute an objection that certainly might be made (but rather with the sophistry of the advocate than with the acuteness of the scientist), namely, that the æsthetic of the intuition also, since it describes the content of art as feeling

or state of the soul, qualifies it outside the intuition, and seems to admit that a content, which is not feeling or a state of the soul, does not lend itself to artistic elaboration, and is not an æsthetic content. Feeling, or the state of the soul, is not a particular content, but the whole universe seen *sub specie intuitionis*; and outside it there is no other content conceivable that is not also a different form of the intuitive form; not thoughts, which are the whole universe *sub specie cogitationis*; not physical things and mathematical beings, which are the whole universe *sub specie schematismi et abstractionis*; not wills, which are the whole universe *sub specie volitionis*.

Another not less fallacious distinction (to which the words "content" and "form" are also applied) separates *intuition* from *expression*, the image from the physical translation of the image. It places on one side phantasms of feeling, images of men, of animals, of landscapes, of actions, of adventures, and so on; and on the other, sounds, tones, lines, colours, and so on; calling the first the external, the second the internal element of art: the *art* properly so-called, the other *technique*. It is easy to distinguish internal and external, at least in words, especially when no minute enquiry is made as to the reasons and motives for the distinction, and when the distinction is just thrown down there without any service being demanded of it; so easy that by never thinking about it the distinction may eventually come to seem to thought indubitable. But it becomes a different question when, as must be done with every distinction, we pass from the act of distinguishing to that of establishing relation and unifying, because this time we run against desperate obstacles. What has here been distinguished cannot be unified, because it has been badly distinguished: how can something external and extraneous to the internal become united to the internal

and express it? How can a sound or a colour express an image without sound and without colour? How can the bodiless express a body? How can the spontaneity of fancy and of reflection and even technical action coincide in the same act? When the intuition has been distinguished from the expression, and the one has been made different from the other, no ingenuity of terms can reunite them; all the processes of association, of habit, of mechanising, of forgetting, of instinctification, proposed by the psychologists and laboriously developed by them, allow the scissure to reappear at the end: on one side the expression, on the other the image. And there does not seem to be any way of escape, save that of taking refuge in the hypothesis of a mystery which, according to poetical or mathematical tastes, will assume the appearance of a mysterious marriage or of a mysterious psychophysical parallelism. The first is a parallelism incorrectly overcome; the second, a marriage deferred to distant ages or to the obscurity of the unknowable.

But before having recourse to mystery (a refuge to which there is always time to fly), we must enquire whether the two elements have been correctly distinguished, and if an intuition without expression be conceivable. It may happen that the thing is as little existing and as inconceivable as a soul without a body, which has truly been as much talked of in philosophies as in religions, but to have talked about it is not the same thing as to have experienced and conceived it. In reality, we know nothing but expressed intuitions: a thought is not thought for us, unless it be possible to formulate it in words; a musical fancy, only when it becomes concrete in sounds; a pictorial image, only when it is coloured. We do not say that the words must necessarily be declaimed in a loud voice, the music performed, or the picture painted upon wood or canvas; but it is certain that

when a thought is really thought, when it has attained to the maturity of thought, the words run through our whole organism, soliciting the muscles of our mouth and ringing internally in our ears; when music is truly music, it trills in the throat and shivers in the fingers that touch ideal notes; when a pictorial image is pictorially real, we are impregnated with lymphs that are colours, and maybe, where the colouring matters were not at our disposition, we might spontaneously colour surrounding objects by a sort of irradiation, as is said of certain hysterics and of certain saints, who caused the stigmata upon their hands and feet by means of an act of imagination! Thought, musical fancy, pictorial image, did not indeed exist without expression, they did not exist at all previous to the formation of this expressive state of the spirit. To believe in their pre-existence is ingenuousness, if it be ingenuous to have faith in those impotent poets, painters, or musicians who always have their heads full of poetic, pictorial, and musical creations, and only fail to translate them into external form, either because, as they say, they are impatient of expression, or because technique is not sufficiently advanced to afford sufficient means for their expression: many centuries ago it offered sufficient means to Homer, Pheidias, and Apelles, but it does not suffice for them, who, if we are to believe them, carry in their mighty heads an art greater than those others! Sometimes, too, ingenuousness arises from the illusion due to keeping a bad account with ourselves that, having imagined, and consequently expressed, some few images, we already possess in ourselves all the other images that must form part of a work, which we do not yet possess, as well as the vital nexus that should connect them, which is not yet formed and therefore is not expressed.

Art, understood as intuition, according to the concept that

I have exposed, having denied the existence of a physical world outside of it, which it looks upon as simply a construction of our intellect, does not know what to do with the parallelism of the thinking substance and of substance extended in space, and has no need to promote impossible marriages, because its thinking substance—or, better, its intuitive act—is perfect in itself, and is that same fact which the intellect afterwards constructs as extended. And inasmuch as an image without expression is inconceivable, by just so much is an image which shall be also expression conceivable, and indeed logically necessary; that is, which shall be really an image. If we take from a poem its metre, its rhythm, and its words, poetical thought does not, as some opine, remain behind: there remains nothing. The poetry is born, like those words, that rhythm, and that metre. Nor could expression be compared with the epidermis of organisms, unless it be said (and perhaps this may not be false even in physiology) that all the organism in every cell's cell is also epidermis.

I should, however, be wanting to my methodological convictions and to my intention of doing justice to errors (and I have already done justice to the distinction of form and content by demonstrating the truth at which they aimed and failed to grasp), were I not to indicate what truth may also be active at the base of the false distinction of the indistinguishable, intuition and expression. Fancy and technique are rationally distinguished, though not as elements of art; and they are related and united between themselves, though not in the field of art, but in the wider field of the spirit in its totality. Technical or practical problems to be solved, difficulties to be vanquished, are truly present to the artist, and there is truly something which, without being really physical, and being, like everything real, a spiritual act, can be meta-

phoricised as physical in respect to the intuition. What is this something? The artist, whom we have left vibrating with expressed images which break forth by infinite channels from his whole being, is a whole man, and therefore also a practical man, and as such takes measures against losing the result of his spiritual labour, and in favour of rendering possible or easy, for himself and for others, the *reproduction* of his images; hence he engages in practical acts which assist that work of reproduction. These practical acts are guided, as are all practical acts, by knowledge, and for this reason are called technical; and, since they are practical, they are distinguished from contemplation, which is theoretical, and seem to be external to it, and are therefore called physical: and they assume this name the more easily in so far as they are fixed and made abstract by the intellect. Thus writing and phonography are united with words and music, canvas and wood and walls covered with colours, stone cut and incised, iron and bronze and other metals melted and moulded to certain shapes by sculpture and architecture. So distinct among themselves are the two forms of activity that it is possible to be a great artist with a bad technique, a poet who corrects the proofs of his verses badly, an architect who makes use of unsuitable material or does not attend to statics, a painter who uses colours that deteriorate rapidly: examples of these weaknesses are so frequent that it is not worth while to cite any of them. But what is impossible is to be a great poet who writes verses badly, a great painter who does not give tone to his colours, a great architect who does not harmonise his lines, a great composer who does not harmonise his notes; and, in short, a great artist who cannot express himself. It has been said of Raphael that he would have been a great painter even if he had not possessed hands; but certainly not that he would have been

a great painter if the sense of design and colour had been wanting to him.

And (be it noted in passing, for I must condense as I proceed) this apparent transformation of the intuitions into physical things—altogether analogous with the apparent transformation of wants and economic labour into things and into merchandise—also explains how people have come to talk not only of “artistic things” and of “beautiful things,” but also of “a beautiful of nature.” It is evident that, besides the instruments that are made for the reproduction of images, objects already existing can be met with, whether produced by man or not, which perform such a service—that is to say, are more or less adapted to fixing the memory of our intuitions; and these things take the name of “natural beauties,” and exercise their fascination only when we know how to understand them with the same soul with which the artist or artists have taken and appropriated them, giving value to them and indicating the “point of view” from which we must look at them, thus connecting them with their own intuitions. But the always imperfect adaptability, the fugitive nature, the mutability of “natural beauties” also justify the inferior place accorded to them, compared with beauties produced by art. Let us leave it to rhetoricians or madmen to affirm that a beautiful tree, a beautiful river, a sublime mountain, or even a beautiful horse or a beautiful human figure, are superior to the chisel-stroke of Michelangelo or the verse of Dante; but let us say, with greater propriety, that “Nature” is stupid compared with Art, and that she is “mute,” if man does not make her speak.

A third distinction, which also labours to distinguish the indistinguishable, is attached to the concept of the æsthetic expression, and divides it into two moments of expression abstractly considered, *propriety* and beauty of expres-

sion, or *adorned* expression, founding upon these the classification of two orders of expression, naked and ornate. This is a doctrine of which traces may be found in all the various domains of art, but which has not been developed in any one of them to the same extent as in that of words, where it bears a celebrated name and is called "Rhetoric," and has had a very long history, from the Greek rhetoricians to our own day. It persists in the schools, in treatises, and even in *æsthetics* of scientific pretensions, not to mention in common belief (as is natural), though in our day it has lost much of its primitive vigour. Men of lofty intellect have accepted it, or let it live, for centuries, owing to the force of inertia or of tradition; the few rebels have hardly ever attempted to reduce their rebellion to a system and to cut out the error at its roots. The injury done by Rhetoric, with its idea of "ornate" as differing from, and of greater value than, "naked" speech, has not been limited solely to the circle of *æsthetic*, but has appeared also in criticism, and even in literary education, because, just as it was incapable of explaining perfect beauty, so it was adapted to provide an apparent justification for vitiated beauty, and to encourage writing in an inflated, affected, and improper form. However, the division which it introduces and on which it relies is a logical contradiction, because, as is easy to prove, it destroys the concept itself, which it undertakes to divide into moments, and the objects, which it undertakes to divide into classes. An appropriate expression, if appropriate, is also beautiful, beauty being nothing but the determination of the image, and therefore of the expression; and if it be wished to indicate by calling it naked that there is something wanting which should be present, then the expression is inappropriate and deficient, either it is not or is not yet expression. On the other hand, an ornate expression, if it

be expressive in every part, cannot be called ornate, but as naked as the other, and as appropriate as the other; if it contain inexpressive, additional, extrinsic elements, it is not beautiful, but ugly, it is not or is not yet expression; to be so, it must purify itself of external elements (as the other must be enriched with the elements that are wanting).

Expression and beauty are not two concepts, but a single concept, which it is permissible to designate with either synonymous vocable: artistic fancy is always corporeal, but it is not obese, being always clad with itself and never charged with anything else, or "ornate." Certainly a problem was lurking beneath this falsest of distinctions, the necessity of making a distinction; and the problem (as can be deduced from certain passages in Aristotle, and from the psychology and gnoseology of the Stoics, and as we see it, intensified in the discussions of the Italian rhetoricians of the seventeenth century) was concerned with the relations between thought and fancy, philosophy and poetry, logic and æsthetic (dialectic and rhetoric, or, as was still said at the time, the "open" and the closed "fist"). "Naked" expression referred to thought and to philosophy, "ornate" expression to fancy and to poetry. But it is not less true that this problem as to the distinction between the two forms of the theoretical spirit could not be solved in the field of one of them, intuition or expression, where nothing will ever be found but fancy, poetry, æsthetic; and the undue introduction of logic will only project there a deceitful shadow, which will darken and hamper intelligence, depriving it of the view of art in its fulness and purity, without giving it that of logicity and of thought.

But the greatest injury caused by the rhetorical doctrine of "ornate" expression to the theoretical systematisation of the forms of the human spirit, concerns the treatment of lan-

guage, because, granted that we admit naked and simply grammatical expressions, and expressions that are ornate or rhetorical, language becomes an aggregate of naked expressions and is handed over to grammar, and, as an ulterior consequence (since grammar finds no place in rhetoric and æsthetic), to logic, where the subordinate office of a semeiotic or *ars significandi* is assigned to it. Indeed, the logistic conception of language is closely united and proceeds *pari passu* with the rhetorical doctrine of expression; they appeared together in Hellenic antiquity, and they still exist, though disputed, in our time. Rebellions against the logicism of the doctrine of language have rarely appeared, and have had as little efficacy as those against rhetoric; and only in the romantic period (traversed by Vico a century before) has a lively consciousness been formed by certain thinkers as to the *fantastic* or *metaphoric* nature of language, and its closer connection with poetry than with logic. Yet since a more or less inartistic idea of art persisted even among the best (conceptualism, moralism, hedonism, etc.), there remained a very powerful impediment to the *identification of language and art*. This identification appears to be as unavoidable as it is easy, having established the concept of art as intuition and of intuition as expression, and therefore implicitly its identity with language: always assuming that language be conceived in its full extension, without arbitrary restrictions to so-called articulate language and without arbitrary exclusion of tonic, mimetic, and graphic; and in all its intension—that is, taken in its reality, which is the act of speaking itself, without falsifying it with the abstractions of grammars and vocabularies, and with the foolish belief that man speaks with the vocabulary and with grammar. Man speaks at every instant like the poet, because, like the poet, he expresses his impressions and his

feelings in the form called conversational or familiar, which is not separated by any abyss from the other forms called prosaic, poetic-prosaic, narrative, epic, dialogue, dramatic, lyric, melic, song, and so on. And if it do not displease man in general to be considered poet and always poet (as he is by force of his humanity), it should not displease the poet to be united with common humanity, because this union alone explains the power which poetry, understood in the loftiest and in the narrowest sense, wields over all human souls. Were poetry a language apart, a "language of the gods," men would not understand it; and if it elevate them, it elevates them not above, but within themselves: true democracy and true aristocracy coincide in this field also. Coincidence of art and language, which implies, as is natural, coincidence of æsthetic and of philosophy of language, definable the one by the other and therefore identical,—this I ventured to place twelve years ago in the title of a treatise of mine on *Æsthetic*, which has truly not failed of its effect upon many linguists and philosophers of *Æsthetic* in Italy and outside Italy, as is shewn by the copious "literature" which it has produced. This identification will benefit studies on art and poetry by purifying them of hedonistic, moralistic, and conceptualistic residues, still to be found in such quantity in literary and artistic criticism. But the benefit which it will confer upon linguistic studies will be far more inestimable, for it is urgent that they should be disencumbered of physiological, psychological, and psychophysiological methods, now the fashion, and be freed from the ever returning theory of the *conventional* origin of language, which has the inevitable correlative of the *mystical* theory as its inevitable reaction. It will no longer be necessary to construct absurd parallelisms even for language, or to promote mysterious nuptials between sign and image: when language is no longer con-

ceived as a sign, but as an image which is significant—that is, a sign in itself, and therefore coloured, sounding, singing, articulate. The significant image is the spontaneous work of the human spirit, whereas the sign, wherewith man agrees with man, presupposes language; or if it be wished, nevertheless, to explain language by signs, it recommends us to call upon God, as upon the giver of the first signs—that is, to presuppose language in another way, by consigning it to the Unknowable.

I shall conclude my account of the prejudices relating to art with that one of them which is most usual, because it is mingled with the daily life of criticism, namely, history of art: prejudice of the possibility of distinguishing several or many *particular forms of art*, each one determinable in its own particular concept and within its limits, and furnished with its proper laws. This erroneous doctrine is embodied in two systematic series, one of which is known as the *theory of literary and artistic kinds* (lyric, drama, romance, epic and romantic poem, idyll, comedy, tragedy; sacred, civil-life, familiar, from life, still-life, landscape, flower and fruit painting; heroic, funereal, costume, sculpture; church, operatic, chamber music; civil, military, ecclesiastic architecture, etc., etc.), and the other as *theory of the arts* (poetry, painting, sculpture, architecture, music, art of the actor, gardening, etc., etc.). One of these sometimes figures as a subdivision of another. This prejudice, of which it is easy to trace the origin, has its first notable monuments in Hellenic culture, and persists in our days. Many æstheticians still write treatises on the æsthetic of the tragic, the comic, the lyric, the humorous, and æsthetics of painting, of music, or of poetry (these last are still called by the old name of “poetics”); and, what is worse (though but little attention is paid to these æstheticians who are im-

pelled to write through solitary dilettantism or academic profession), critics, in judging works of art, have not altogether abandoned the habit of judging them according to the genus or particular form of art to which, according to the above æstheticians, they should belong; and, instead of clearly stating whether a work be beautiful or ugly, they proceed to reason their impressions, saying that it well observes, or wrongly violates, the laws of the drama, or of romance, or of painting, or of bas-relief. It is also very common in all countries to treat artistic and literary history as *history of kinds*, and to present the artists as cultivating this or that kind; and to divide the work of an artist, which always has unity of development, whatever form it take, whether lyric, romance or drama, into as many compartments as there are kinds; so that Lodovico Ariosto, for example, appears now among the cultivators of the Latin poetry of the Renaissance, now among the authors of the first Latin satires, now among those of the first comedies, now among those who brought the poem of chivalry to perfection: as though Latin poetry, satire, comedy, and poem were not always the same poet, Ariosto, in his experiments, in his logic, and in the manifestations of his spiritual development.

It is not to be denied that the theory of kinds and of the arts has not had, and does not now possess, its own internal dialectic and its autocriticism, or irony, according as we may please to call it; and no one is ignorant that literary history is full of these cases of an established style, against which an artist of genius offends in his work and calls forth the reprobation of the critics: a reprobation which does not, however, succeed in suffocating the admiration for, and the popularity of, his work, so that finally, when it is not possible to blame the artist and it is not wished to blame the critic of kinds, the

matter ends with a compromise, and the kind is enlarged or accepts beside it a new kind, like a legitimated bastard, and the compromise lasts, by force of inertia, until a new work of genius comes to upset again the fixed rule. An irony of the doctrine is also the impossibility, in which the theoreticians find themselves, of logically fixing the boundaries between the kinds and the arts: all the definitions that they have produced, when examined rather more closely, either evaporate in the general definition of art, or shew themselves to be an arbitrary raising to the rank of kinds and rules particular works of art irreducible to rigorous logical terms. Absurdities resulting from the effort to determine rigorously what is indeterminable, owing to the contradictory nature of the attempt, are to be found even among the great ones, even in Lessing, who arrives at this extravagant conclusion, that painting represents "bodies": bodies, not actions and souls, not the action and the soul of the painter! They are also to be found among the questions that logically arise from that illogic: thus, a definite field having been assigned to every kind and to every art, what kind and what art is *superior*? Is painting superior to sculpture, drama to lyric? And again, the forces of art having been thus divided, would it not be advisable to reunite them in a type of work of art which shall drive away other forces, as a coalition of armies drives away a single army: will not the work, for instance, in which poetry, music, scenic art, decoration, are united, develop a greater æsthetic force than a *Lied* of Goethe or a drawing of Leonardo? These are questions, distinctions, judgments, and definitions which arouse the revolt of the poetic and artistic sense, which loves each work for itself, for what it is, as a living creature, individual and incomparable, and knows that each work has its individual law. Hence has arisen the disagreement between the

affirmative judgment of artistic souls and the negative one of professional critics, between the negation of the former and the affirmation of the latter; and the professional critics pass for pedants, not without good reason, although artistic souls are in their turn "disarmed prophets"—that is, incapable of reasoning and of deducing the correct theory immanent in their judgments, and of opposing it to the pedantic theory of their adversaries.

That correct theory is precisely an aspect of the conception of art as intuition, or lyrical intuition; and, since every work of art expresses a state of the soul, and the state of the soul is individual and always new, the intuition implies infinite intuitions, which it is impossible to place in pigeonholes as *kinds*, unless these be infinite pigeonholes, and therefore not pigeonholes of kinds, but of intuitions. And since, on the other hand, individuality of intuition implies individuality of expression, and a picture is distinct from another picture, not less than from a poem, and picture and poem are not of value because of the sounds that beat the air and the colours refracted by the light, but because of what they can tell to the spirit, in so far as they enter into it, it is useless to have recourse to abstract means of expression, to construct the other series of kinds and classes: which amounts to saying that any theory of the division of the arts is without foundation. The kind or class is in this case one only, art itself or the intuition, whereas single works of art are infinite: all are original, each one incapable of being translated into the other (since to translate, to translate with artistic skill, is to create a new work of art), each one uncontrolled by the intellect. No intermediate element interposes itself philosophically between the universal and the particular, no series of kinds or species, of *generalia*. Neither the artist who produces art, nor the spectator who contemplates

it, has need of anything but the universal and the individual, or, better, the universal individuated: the universal artistic activity, which is all contracted or concentrated in the representation of a single state of the soul.

Nevertheless, if the pure artist and the pure critic, and also the pure philosopher, are not occupied with *generalia*, with classes or kinds, these retain their utility on other grounds; and this utility is the true side of those erroneous theories, which I will not leave without mention. It is certainly useful to construct a net of *generalia*, not for the production of art, which is spontaneous, nor for the judgment of it, which is philosophical, but to collect and to some extent circumscribe the infinite single intuitions, for the use of the attention and of memory, in order to group together to some extent the innumerable particular works of art. These classes will always be formed, as is natural, either by means of the abstract imagination or the abstract expression, and therefore as classes of states of the soul (literary and artistic kinds) and classes of means of expression (art). Nor does it avail to object here that the various kinds and arts are arbitrarily distinguished, and that the general dichotomy is itself arbitrary; since it is admitted without difficulty that the procedure is certainly arbitrary, but the arbitrariness becomes innocuous and useful from the very fact that every pretension of being a philosophical principle and criterion for the judgment of art is removed from it. Those kinds and classes render easy the knowledge of art and education in art, offering to the first, as it were, an index of the most important works of art, to the second a collection of most important information suggested by the practice of art. Everything depends upon not confounding hints with reality, and hypothetic warnings or imperatives with categoric imperatives: a confusion which multiple and continuous

temptations are certainly apt to induce, whence it is easy to be dominated by them, but not at all inevitable. Books of literary origin, rhetoric, grammar (with their divisions into parts of speech and their grammatical and syntactical laws), of the art of musical composition, of metre, of painting, and so on, contain the principal hints and collections of precepts. Tendencies toward a definite expression of art are manifested in them either only in a secondary manner,—and in this case it is art that is still abstract, art in elaboration (the poetic arts of classicism or romanticism, purist or popular grammars, etc.),—or as tendencies toward the philosophical comprehension of their argument, and then they give rise to the divisions into kinds and into arts, an error which I have criticised: an error which, by its contradictions, opens the way to the true doctrine of the individuality of art.

Certainly this doctrine produces at first sight a sort of bewilderment: individual, original, untranslatable, unclassifiable intuitions seem to escape the rule of thought, which would seem unable to dominate them without placing them in relation with one another; and this appears to be precisely forbidden by the doctrine that has been developed, which has rather the air of being anarchic or anarchoid than liberal and liberistic.

A little piece of poetry is æsthetically equal to a poem; a tiny little picture or a sketch, to an altar picture or an *affresco*; a letter is a work of art, no less than a romance; even a fine translation is as original as an original work! These propositions will be indubitable, because logically deduced from verified premises; they will be true, although (and this is without doubt a merit) paradoxical, or at variance with vulgar opinions: but will they not be in want of some complement? There must be some mode of arranging, subordinating, connecting, understanding, and domi-

nating the dance of the intuitions, if we do not wish to bewilder our wits with them.

And there is indeed such a mode, for when we denied theoretic value to abstract classifications we did not intend to deny it to that genetic and concrete classification which is not, indeed, a "classification" and is called *History*. In history each work of art takes the place that belongs to it—that and no other: the ballade of Guido Cavalcanti and the sonnet of Cecco Angiolieri, which seem to be the sigh or the laughter of an instant; the "*Commedia*" of Dante, which seems to resume in itself a millennium of the human spirit; the "Maccheronee" of Merlin Cocaio at the close of the Middle Ages, with their noisy laughter; the elegant Cinquecento translation of the *Æneid* by Annibal Caro; the dry prose of Sarpi; and the Jesuitic-polemical prose of Daniello Bartoli: without the necessity of judging that to be not original which is original, because it lives; that to be small which is neither great nor small, because it escapes measure: or we can say great and small, if we will, but metaphorically, with the intention of manifesting certain admirations and of noting certain relations of importance (quite other than arithmetic or geometrical). And in history, which is ever becoming richer and more definite, not in pyramids of empirical concepts, which become more and more empty the higher they rise and the more subtle they become, is to be found the link of all works of art and of all intuitions, because in history they appear organically connected among themselves, as successive and necessary stages of the development of the spirit, each one a note of the eternal poem which harmonises all single poems in itself.

III

THE PLACE OF ART IN THE SPIRIT AND IN HUMAN SOCIETY

THE dispute as to the dependence or independence of art was at its hottest in the romantic period, when the motto of "art for art's sake" was coined, and as its apparent antithesis that other of "art for life"; and from that time it was discussed, to tell the truth, rather among men of letters or artists than philosophers. It has lost interest in our day, fallen to the rank of a theme with which beginners amuse or exercise themselves, or of an argument for academic orations. However, even previous to the romantic period, and indeed in the most ancient documents containing reflections upon art, are to be found traces of it; and philosophers of Æsthetic themselves, even when they appear to neglect it (and they do indeed neglect it in its vulgar form), really do consider it, and indeed may be said to think of nothing else. Because, to dispute as to the dependence or the independence, the autonomy or the heteronomy of art does not mean anything but to enquire whether *art is or is not*, and, if it is, *what it is*. An activity whose principle depends upon that of another activity is, effectively, that other activity, and retains for itself an existence that is only putative or conventional: art which depends upon morality, upon pleasure, or upon philosophy is morality, pleasure, or philosophy; it is not art. If it be held not to be dependent, it will be advisable to investigate the foundation of its independence—that is to say, how art is distinguished from morality, from pleasure, from philosophy, and from all

other things; what it is—and to posit whatever it may be as truly autonomous and independent. It may chance to be asserted, on the other hand, by those very people who affirm the concept of the original nature of art, that although it preserve its peculiar nature, yet its place is below another activity of superior dignity, and (as used at one time to be said) that it is a handmaid to ethic, a minister to politics, and a dragoman to science; but this would only prove that there are people who have the habit of contradicting themselves or of allowing discord among their thoughts: dazed folk whose existence truly does not call for any sort of proof. For our part, we shall take care not to fall into so dazed a condition; and having already made clear that art is distinguished from the physical world and from the practical, moral, and conceptual activity as *intuition*, we shall give ourselves no further anxiety, and shall assume that with that first demonstration we have also demonstrated the *independence* of art.

But another problem is implicit in the dispute as to dependence or independence; of this I have hitherto purposely not spoken, and I shall now proceed to examine it. Independence is a concept of relation, and in this aspect the only absolute independence is the Absolute, or absolute relation; every particular form and concept is independent on one side and dependent on another, or both independent and dependent. Were this not so, the spirit, and reality in general, would be either a series of juxtaposed absolutes, or (which amounts to the same thing) a series of juxtaposed nullities. The independence of a form implies the matter to which it is applied, as we have already seen in the development of the genesis of art as an intuitive formation of a sentimental or passionate material; and in the case of absolute independence, since all material and aliment would be want-

ing to it, form itself, being void, would become nullified. But since the recognised independence prevents our thinking one activity as submitted to the principle of another, the dependence must be such as to guarantee the independence. But this would not be guaranteed in the hypothesis that one activity should be made to depend upon another, in the same way as that other upon it, like two forces which counterbalance each other, and of which the one does not conquer the other; because, if it do not conquer it, we have reciprocal arrest and static; if it conquer the other, pure and simple dependence, which has already been excluded. Hence, considering the matter in general, it appears that there is no other way of thinking the simultaneous independence and dependence of the various spiritual activities than that of conceiving them in the relation of condition and conditioned, in which the conditioned surpasses the condition and presupposes it, and, becoming again in its turn condition, gives rise to a new conditioned, thus constituting a series of *developments*. No other defect could be attributed to this series than that the first of the series would be a condition without a previous conditioned, and the last conditioned which would not become in its turn condition, thus causing a double rupture of the law of development itself. Even this defect is healed if the last be made the condition of the first and the first the condition of the last; that is to say, if the series be conceived as reciprocal action, or, better (and abandoning all naturalistic phraseology), as a *circle*. This conception seems to be the only way out of the difficulties with which the other conceptions of the spiritual life are striving, both that which makes it consist of an assemblage of independent and unrelated faculties of the soul, or of independent and unrelated ideas of value, and that which subordinates all these in one and resolves them in that one,

which remains immobile and impotent; or, more subtly, conceives them as necessary grades of a linear development which leads from an irrational first to a last that would wish to be most rational, but is, however, superrational, and as such also irrational.

But it will be opportune not to insist upon this somewhat abstract scheme, and rather consider the manner in which it becomes actual in the life of the spirit, beginning with the æsthetic spirit. For this purpose we shall again return to the artist, or man-artist, who has achieved the process of liberation from the sentimental tumult and has objectified it in a lyrical image—that is, has attained to art. He finds his satisfaction in this image, because he has worked and moved in this direction: all know more or less the joy of the complete expression which we succeed in giving to our own psychical impulses, and the joy in those of others, which are also ours, when we contemplate the works of others, which are to some extent ours, and which we make ours. But is the satisfaction definite? Was only the man-artist impelled toward the image? Toward the *image* and toward *another* at the same time; toward the image in so far as he is man-artist, toward another in so far as he is artist-man; toward the image on the first plane, but, since the first plane is connected with the second and third planes, also toward the second and third, although immediately toward the first and mediately toward the second and third? And now that he has reached the first plane, the second appears immediately behind it, and becomes a direct aim from indirect that it was before; and a new demand declares itself, a new process begins. Not, be it well observed, that the intuitive power gives place to another power, as though taking its turn of pleasure or of service; but the intuitive power itself—or, better, the spirit itself, which at first seemed to be, and in a

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certain sense was, all intuition—develops in itself the new process, which comes forth from the vitals of the first. "One soul is not kindled at another" in us (I shall avail myself again on this occasion of Dante's words), but the one soul, which first is all collected in one single "virtue," and which "seems to obey no longer any power," satisfied in that virtue alone (in the artistic image), finds in that virtue, together with its satisfaction, its dissatisfaction: its satisfaction, because it gives to the soul all that it can give and is expected from it; its dissatisfaction, because, having obtained all that, and having satiated the soul with its ultimate sweetness,— "what is asked and thanked for,"—satisfaction is sought for the new need caused by the first satisfaction, which was not able to arise without that first satisfaction. And we all know also, from continual experience, the new want which lurks behind the formation of images. Ugo Foscolo has a love-affair with the Countess Arese; he knows with what sort of love and with what sort of woman he has to do, as can be proved from the letters he wrote, which are to be read in print. Nevertheless, during the moments that he loves her, that woman is his universe, and he aspires to possess her as the highest beatitude, and in the enthusiasm of his admiration would render the mortal woman immortal, would transfigure this earthly creature into one divine for the time to come, achieving for her a new miracle of love. And indeed he already finds her rapt to the empyrean, an object of worship and of prayers:

*And thou, divine one, living in my hymns,
Shalt receive the vows of my Insubrian descendants.*

The ode *All' amica risanata* would not have taken shape in the spirit of Foscolo unless this metamorphosis of love had been desired and longed for with the greatest seriousness

(lovers and even philosophers, if they have been in love, can witness that these absurdities are seriously desired); and the images with which Foscolo represents the fascination of his goddess-friend, so rich in perils, would not have presented themselves so vividly and so spontaneously as they did. But what was that impetus of the soul which has now become a magnificent lyrical representation? Was all of Foscolo, the soldier, the patriot, the man of learning, moved with so many spiritual needs, expressed in that aspiration? Did it act so energetically within him as to be turned into action, and to some extent to give direction to his practical life? Foscolo, who had not been wanting of insight in the course of his love, as regards his poetry also from time to time became himself again when the creative tumult was appeased, and again acquired full clearness of vision. He asks himself what he really did will, and what the woman deserved. It may be that a slight suspicion of scepticism had insinuated itself during the formation of the image, if our ears be not deceived in seeming to detect here and there in the ode some trace of elegant irony toward the woman, and of the poet toward himself. This would not have happened in the case of a more ingenuous spirit, and the poetry would have flowed forth quite ingenuously. Foscolo the poet, having achieved his task and therefore being no longer poet, now wishes to know his real condition. He no longer forms the image, because he has formed it; he no longer fancies, but perceives and narrates ("that woman," he will say later of the "divine one," "had a piece of brain instead of a heart"); and the lyrical image changes, for him and for us, into an autobiographical extract, or *perception*.

With perception we have entered a new and very wide spiritual field; and, truly, words are not strong enough to satirise those thinkers who, now as in the past, confound

image and perception, making of the image a perception (a portrait or copy or imitation of nature, or history of the individual and of the times, etc.), and, worse still, of the perception a kind of image apprehensible by the "senses." But perception is neither more nor less than a complete *judgment*, and as judgment implies an image and a category or system of mental categories which must dominate the image (reality, quality, etc.); and in respect of the image, or a *a priori æsthetic synthesis* of feeling and fancy (intuition), it is a new synthesis, of representation and category, of subject and predicate, the *a priori logical synthesis*, of which it would be fitting to repeat all that has been said of the other, and, above all, that in its content and form, representation and category, subject and predicate, do not appear as two elements united by a third, but the representation appears as category, the category as representation, in indivisible unity: the subject is subject only in the predicate, and the predicate is predicate only in the subject. Nor is perception a logical act among other logical acts, or the most rudimentary and imperfect of them; for he who is able to extract from it all the treasures it contains would have no need to seek beyond it for other determinations of logicity, because consciousness of what has really happened, which in its eminently literary forms takes the name of *history*, and consciousness of the universal, which in its eminent forms takes the name of system or *philosophy*, spring from perception, which is itself this synthetic gemination: and philosophy and history constitute the superior unity, which philosophers have discovered, for no other reason than the synthetic connection of the perceptive judgment, whence they are born and in which they live, identifying philosophy and history, and which men of good sense discover in their own way, though they always observe that ideas suspended

in air are phantoms, are facts which occur—real facts—what alone is true, and alone worthy of being known. Finally, perception (the variety of perceptions) explains why the human intellect strives to emerge from them and to impose upon them a world of types and of laws, governed by mathematical measures and relations; which is the reason of the formation of the *natural sciences and mathematics*, in addition to philosophy and history.

It is not here my task to give a sketch of Logic, as I have been or am giving a sketch of Æsthetic; and therefore, refraining from determining and developing the theory of Logic, and intellectual, perceptive, and historical knowledge, I shall resume the thread of the argument, not proceeding on this occasion from the artistic and intuitive spirit, but from the logical and historical, which has surpassed the intuitive and has elaborated the image in perception. Does the spirit find satisfaction in this form? Certainly: all know the very lively satisfactions of knowledge and science; all know, from experience, the desire which takes possession of one to discover the countenance of reality, concealed by our illusions; and even though that countenance be terrible, the discovery is never unaccompanied with profound pleasure, due to the satisfaction of possessing the truth. But does such satisfaction differ in being complete and final from that afforded by art? Does not dissatisfaction perhaps appear side by side with the satisfaction of knowing reality? This, too, is most certain; and the dissatisfaction of having known manifests itself (as indeed all know by experience) in the desire for action: it is well to know the real state of affairs, but we must know it in order to act; by all means let us know the world, but in order that we may change it: *tempus cognoscendi, tempus destruendi, tempus renovandi*. No man remains stationary in knowledge, not

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even sceptics or pessimists who, in consequence of that knowledge, assume this or that attitude, adopt this or that form of life. And that very fixing of acquired knowledge, that "retaining" after "understanding," without which (still quoting Dante) "there can be no science," the formation of types and laws and criteria of measurement, the natural sciences and mathematics, to which I have just referred, were a surpassing of the act of theory by proceeding to the act of action. And not only does everyone know from experience, and can always verify by comparison with facts, that this is indeed so; but on consideration, it is evident that things could not proceed otherwise. There was a time (which still exists for not a few unconscious Platonicians, mystics, and ascetics) when it was believed that to know was to elevate the soul to a god, to an Idea, to a world of ideas, to an Absolute placed above the phenomenal human world; and it was natural that when the soul, becoming estranged from itself by an effort against nature, had attained to that superior sphere, it returned confounded to earth, where it could remain perpetually happy and inactive. That thought, which was no longer thought, had for counterpoise a reality that was not reality. But since (with Vico, Kant, Hegel, and other heresiarchs) knowledge has descended to earth, and is no longer conceived as a more or less pallid copy of an immobile reality, but remains always human, and produces, not abstract ideas, but concrete concepts which are syllogisms and historical judgments, perceptions of the real, the practical is no longer something that represents a degeneration of knowledge, a second fall from heaven to earth, or from paradise to hell, nor something that can be resolved upon or abstained from, but is implied in theory itself, as a demand of theory; and as the theory, so the practice. Our thought is historical thought of a his-

torical world, a process of development of a development; and hardly has a qualification of reality been pronounced, when the qualification is already of no value, because it has itself produced a new reality, which awaits a new qualification. A new reality, which is economic and moral life, turns the intellectual into the practical man, the politician, the saint, the man of business, the hero, and elaborates *the a priori logical synthesis into the practical a priori synthesis*; but this is nevertheless always a new feeling, a new desiring, a new willing, a new passionality, in which the spirit can never rest, and solicits above all as new material a new intuition, a new lyricism, a new art.

And thus the last term of the series reunites itself (as I stated at the beginning) with the first term, the circle is closed, and the passage begins again: a passage which is a return of that already made, whence the Vichian concept expressed in the word "return," now become classic. But the development which I have described explains the independence of art, and also the reasons for its apparent dependence, in the eyes of those who have conceived erroneous doctrines (hedonistic, moralistic, conceptualistic, etc.), which I have criticised above, though noting, in the course of criticism, that in each one of them could be found some reference to truth. If it be asked, which of the various activities of the spirit is real, or if they be all real, we must reply that none of them is real; because the only reality is the activity of all these activities, which does not reside in any one of them in particular: of the various syntheses that we have one after the other distinguished,—æsthetic synthesis, logical synthesis, practical synthesis,—the only real one is the *synthesis of syntheses*, the Spirit, which is the true Absolute, the *actus purus*. But from another point of view, and for the same reason, all are real, in the unity of the spirit, in the eternal

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going and coming, which is their eternal constancy and reality. Those who see in art the concept, history, mathematics, the type, morality, pleasure, and everything else, are right, because these and all other things are contained within it, owing to the unity of the spirit; indeed, the presence in it of them all, and the energetic unilaterality alike of art as of any other particular form, tending to reduce all activities to one, explains the passage from one form to another, the completing of one form in the other, and it explains development. But those same people are wrong (owing to the distinction, which is the inseparable moment of unity) in the way that they find them all equally abstract or equally confused. Because concept, type, number, measure, morality, utility, pleasure and pain are in art as art, either antecedent or consequent; and therefore are there presupposed (sunk and forgotten there, to adopt a favourite expression of De Sanctis) or as presentiments. Without that presumption, without that presentiment, art would not be art; but it would not be art either (and all the other forms of the spirit would be disturbed by it), if it were desired to impose those values upon art as art, which is and never can be other than pure intuition. The artist will always be morally blameless and philosophically uncensurable, even though his art should indicate a low morality and philosophy: in so far as he is an artist, he does not act and does not reason, but poetises, paints, sings and, in short, expresses himself: were we to adopt a different criterion, we should return to the condemnation of Homeric poetry, in the manner of the Italian critics of the Seicento and the French critics of the time of the fourteenth Louis, who turned up their noses at what they termed "the manners" of those inebriated, vociferating, violent, cruel and ill-educated heroes. The criticism of the philosophy underlying Dante's poem

is certainly possible, but that criticism will enter the subterranean parts of the art of Dante as though by undermining, and will leave intact the soil on the surface, which is the art; Nicholas Macchiavelli will be able to destroy the Dantesque political ideal, recommending neither an emperor nor an international pope as greyhound of liberation, but a tyrant or a national prince; but he will not have eradicated that aspiration from Dante's poem. In like manner, it may be advisable not to show and not to permit to boys and young men the reading of certain pictures, romances, and plays; but this recommendation and act of forbidding will be limited to the practical sphere and will affect, not the works of art, but the books and canvases which serve as instruments for the reproduction of the art, which, as practical works, paid for in the market at a price equivalent to so much corn or gold, can also themselves be shut up in a cabinet or cupboard, and even be burnt in a "pyre of vanities," *à la* Savonarola. To confound the various phases of development in an ill-understood impulse for unity, to make morality dominate art, when and so far as art surpasses morality, or art dominate science, when and so far as science dominates or surpasses art, or has already been itself dominated and surpassed by life: this is what unity well understood, which is also rigorous distinction, should prevent and reject.

And it should prevent and reject it also, because the established order of the various stages of the circle makes it possible to understand not only the independence and the dependence of the various forms of the spirit, but also the *preservation of this order* of the one in the other. It is well to mention one of the problems which present themselves in this place, or rather to return to it, for I have already referred to it fugitively: the relation between fancy

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and logic, art and science. This problem is substantially the same as that which reappears as the search for the distinction between *poetry* and *prose*; at any rate, since (and the discovery was soon made, for it is already found in the "Poetic" of Aristotle) it was recognised that the distinction cannot be drawn as between the metrical and the unmetrical, since there can be poetry in prose (for example, romances and plays) and prose in metre (for example, didascalic and philosophic poems). We shall therefore conduct it with the more profound criterion, which is that of image and perception, of intuition and judgment, which has already been explained; poetry will be the expression of the image, prose that of the judgment or concept. But the two expressions, in so far as expressions, are of the same nature, and both possess the same æsthetic value; therefore, if the poet be the lyrist of his feelings, the prosaist is also the lyrist of his feelings,—that is, poet,—though it be of the feelings which arise in him from or in his search for the concept. And there is no reason whatever for recognising the quality of poet to the composer of a sonnet and of refusing it to him who has composed the "Metaphysic," the "Somma Teologia," the "Scienza Nuova," the "Phenomenology of the Spirit," or told the story of the Peloponnesian wars, of the politics of Augustus and Tiberius, or the "universal history": in all of those works there is as much passion and as much lyrical and representative force as in any sonnet or poem. For all the distinctions with which it has been attempted to reserve the poetic quality for the poet and to deny it to the prosaist, are like those stones, carried with great effort to the top of a steep mountain, which fall back again into the valley with ruinous results. Yet there is a just apparent difference, but in order to determine it, poetry and prose must not be separated in the manner of

naturalistic logic, like two co-ordinated concepts simply opposed the one to the other: we must conceive them in development as a passage from poetry to prose. And since the poet, in this passage, not only presupposes a passionate material, owing to the unity of the spirit, but preserves the passionality and elevates it to the passionality of a poet (passion for art), so the thinker or prosaist not only preserves that passionality and elevates it to a passionality for science, but also preserves the intuitive force, owing to which his judgments come forth expressed together with the passionality that surrounds them, and therefore they retain their artistic as well as their scientific character. We can always contemplate this artistic character, assuming its scientific character, or separating it therefrom and from the criticism of science, in order to enjoy the æsthetic form which it has assumed; and this is also the reason why science belongs, though in different aspects, to the history of science and to the history of literature, and why, among the many different kinds of poetry enumerated by the rhetoricians, it would at the least be capricious to refuse to number the "poetry of prose," which is sometimes far purer poetry than much pretentious poetry of poetry. And it will be well that I should mention again a new problem of the same sort, to which I have already alluded in passing: namely, the connection between art and morality, which has been denied to be immediate identification of the one with the other, but which must now be reasserted, and to note that, since the poet preserves the passion for his art when free from every other passionality, so he preserves in his art the consciousness of duty (duty toward art), and every poet, in the act of creation, is moral, because he accomplishes a sacred function.

And finally, the order and logic of the various forms of the spirit, making the one necessary for the other and

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therefore all necessary, reveal the folly of negating the one in the name of the other: the error of the philosopher (Plato), or of the moralist (Savonarola or Proudhon), or of the naturalist and practical man (there are so many of these that I do not quote names!), who refute art and poetry; and, on the other hand, the error of the artist who rebels against thought, science, practice, and morality, as did so many "romantics" in tragedy, and as do so many "decadents" in comedy in our day. These are errors and follies to which also we can afford a caress in passing (always keeping in view our plan of not leaving anyone quite disconsolate), for it is evident that they have a positive content of their own in their very negativity, as rebellion against certain false concepts or certain false manifestations of art and of science, of practice and of morality (Plato, for example, combating the idea of poetry as "wisdom"; Savonarola, the not austere and therefore corrupt civilisation of the Italian Renaissance so soon to be dissolved), etc. But it is madness to attempt to prove that were philosophy without art, it would exist for itself, because it would be without what conditions its problems, and air to breathe would be taken from it, in order to make it prevail alone against art; and that practice is not practice, when it is not set in motion and revived by aspirations, and, as they say, by "ideals," by "dear imagining," which is art; and, on the other hand, that art without morality, art that usurps with the decadents the title of "pure beauty," and before which is burnt incense, as though it were a diabolic idol worshipped by a company of devils, owing to the lack of morality in the life from which it springs and which surrounds it, is decomposed as art, and become caprice, luxury, and charlatanry; the artist no longer serves it, but it serves the private and futile interests of the artist as the vilest of slaves.

Nevertheless, objection has been taken to the idea of the circle in general, which affords so much aid in making clear the connection of dependence and independence of art and of the other spiritual forms, on the ground that it thinks the work of the spirit as a tiresome and melancholy doing and undoing, a monotonous turning upon itself, not worth the trouble of effecting. Certainly there is no metaphor but leaves some side open to parody and caricature; but these, when they have gladdened us for the moment, oblige us to return seriously to the thought expressed in the metaphor. And the thought is not that of a sterile repetition of going and coming, but a continuous enrichment in the going of the going and the coming of the coming. The last term, which again becomes the first, is not the old first, but presents itself with a multiplicity and precision of concepts, with an experience of life lived, and even of works contemplated, which was wanting to the old first term; and it affords material for a more lofty, more refined, more complex and more mature art. Thus, instead of being a perpetually even revolution, the idea of the circle is nothing but the true philosophical idea of *progress*, of the perpetual growth of the spirit and of reality in itself, where nothing is repeated, save the form of the growth; unless it should be objected to a man walking, that his walking is a standing still, because he always moves his legs in the same time!

Another objection, or rather another movement of rebellion against the same idea, is frequently to be observed, though not clearly self-conscious: the restlessness, existing in some or several, the endeavour to break and to surpass the circularity that is a law of life, and to attain to a region of repose from movement, so full of anxiety; withdrawn henceforward from the ocean and standing upon the shore, to turn back and contemplate the tossing billows. But I have

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already had occasion to state of what this repose consists: an effectual negation of reality, beneath the appearance of elevation and sublimation; and it is certainly attained, but is called death; the death of the individual, not of reality, which does not die, and is not afflicted by its own motion, but enjoys it. Others dream of a spiritual form, in which the circle is dissolved, a form which should be Thought of thought, unity of the Theoretical and of the Practical, Love, God, or whatever other name it may bear; they fail to perceive that this thought, this unity, this Love, this God, already exists in and for the circle, and that they are uselessly repeating a search already completed, or are repeating metaphorically what has already been discovered, in the myth of another world, where the very drama of the only world should be repeated.

I have hitherto outlined this drama, as it truly is, ideal and extratemporal, employing such terms as first and second, solely with a view to verbal convenience and in order to indicate logical order:—ideal and extratemporal, because there is not a moment and there is not an individual in whom it is not all performed, as there is no particle of the universe unbreathed upon by the Spirit of God. But the ideal, indivisible moments of the ideal drama can be seen as if divided in empirical reality, like an impure and embodied symbol of the ideal distinction. Not that they are really divided (ideality is the true reality), but they appear to be so empirically to him who looks upon them with a view to classification, for he possesses no other way of determining in the types the individuality of the facts that have attracted his attention, save that of enlarging and of exaggerating ideal distinctions. Thus the artist, the philosopher, the historian, the naturalist, the mathematician, the man of business, the good man, seem to live separated from one

The Breviary of Æsthetic

another; and the spheres of artistic, philosophical, historical, naturalistic, mathematical culture, and those of economic and ethic and of the many institutions connected with them, to be distinct from one another; and finally, the life of humanity is divided into epochs in the ages, in which one or the other or only some of the ideal forms are represented: epochs of fancy, of religion, of speculation, of natural sciences, of industrialism, of political passions, of moral enthusiasms, of pleasure seeking, and so on; and these epochs have their more or less perfect goings and comings. But the eye of the historian discovers the perpetual difference in the uniformity of individuals, of classes, and of epochs; and the philosophical consciousness, unity in difference; and the philosopher-historian sees ideal progress and unity, as also historical progress, in that difference.

But let us, too, speak as empiricists for a moment (so that since empiricism exists it may be of some use), and let us ask ourselves to which of the specimens belongs our epoch, or that from which we have just emerged; what is its prevailing characteristic? To this there will be an immediate and universal reply that it is and has been naturalistic in culture, industrial in practice; and philosophical greatness and artistic greatness will at the same time both be denied to it. But since (and here empiricism is already in danger) no epoch can live without philosophy and without art, our epoch, too, has possessed both, so far as it was capable of possessing them. And its philosophy and its art—the former mediately, the latter immediately—find their places in thought, as documents of what our epoch has truly been in its complexity and interests; by interpreting these, we shall be able to clear the ground upon which must arise our *duty*.

Contemporary art, sensual, insatiable in its desire for enjoyments, furrowed with turbid attempts at an ill-un-

derstood aristocracy, which reveals itself as a voluptuous ideal or an ideal of arrogance and of cruelty, sometimes sighing for a mysticism which is also egoistic and voluptuous, without faith in God and without faith in thought, incredulous and pessimistic,—and often very powerful in its rendering of such states of the soul: this art,—vainly condemned by moralists,—when understood in its profound motives and in its genesis, asks for action, which will certainly not be directed toward condemning, repressing, or rearranging art, but toward directing life more energetically toward a more healthy and more profound morality, which will be mother of a nobler art, and, I would also say, of a nobler philosophy. A more noble philosophy than that of our epoch, incapable of accounting not only for religion, for science, and for itself, but for art itself, which has again become a profound mystery, or rather a theme for horrible blunders by positivists, neocriticists, psychologists, and pragmatists, who have hitherto represented contemporary philosophy, and have relapsed (perhaps in order to acquire new strength and to mature new problems!) into the most childish and most crude conceptions of art.

IV

CRITICISM AND THE HISTORY OF ART

ARTISTIC and literary criticism is often looked upon by artists as a morose and tyrannical *pedagogue* who gives capricious orders, imposes prohibitions, and grants permissions, thus aiding or injuring their works by wilfully deciding upon their fate. And so the artists either shew themselves submissive, humble, flattering, adulatory, toward it, while hating it in their hearts; or, when they do not obtain what they want, or their loftiness of soul forbids that they should descend to those arts of the courtier, they revolt against it, proclaiming its uselessness, with imprecations and mockery, comparing (the remembrance is personal) the critic to an ass that enters the potter's shop and breaks in pieces with *quadrupedante ungulæ sonitu* the delicate products of his art set out to dry in the sun. This time, to tell the truth, it is the artists' fault, for they do not know what criticism is, expecting from it favours which it is not in a position to grant, and injuries which it is not in a position to inflict: since it is clear that since no critic can make an artist of one who is not an artist, so no critic can ever undo, overthrow, or even slightly injure an artist who is really an artist, owing to the metaphysical impossibility of such an act: these things have never happened in the course of history, they do not happen in our day, and we can be sure that they will never happen in the future. But sometimes it is the critics themselves, or the self-styled critics, who do actually present themselves as pedagogues, as oracles, as guides of art, as legislators, seers, and prophets; they command artists to

do this or that, they assign themes to them and declare that certain subjects are poetical, and certain others not; they are discontented with the art at present produced, and would prefer one similar to that prevailing at this or that epoch of the past, or at another of which they declare they catch a glimpse in the near or remote future; they will reprove Tasso for not being Ariosto, Leopardi for not being Metastasio, Manzoni for not being Alfieri, D'Annunzio because he is not Berchet or Fra Jacopone; and they describe the great artist of the future, supplying him with ethic, philosophy, history, language, metric, with architectonic and colouristic processes, and with whatever it may seem to them that he stands in need. And this time it is clear that the blame lies with the critic; and the artists are right in behaving toward such brutality in the way that we behave toward beasts, which we try to tame, to illude and to delude, in order that they may serve us; or we drive them away and send them to the slaughter-house when they are no longer good for any service. But for the honour of criticism we must add that those capricious critics are not so much critics as artists: artists who have failed and who aspire to a certain form of art, which they are unable to attain, either because their aspiration was contradictory, or because their power was not sufficient and failed them; and thus, preserving in their soul the bitterness of the unrealised ideal, they can speak of nothing else, lamenting everywhere its absence, and everywhere invoking its presence. And sometimes, too, they are artists who are anything but failures,—indeed, most felicitous artists,—but, owing to the very energy of their artistic individuality, incapable of emerging from themselves in order to understand forms of art different from their own, and disposed to reject them with violence; they are aided in this negation by the *odium figulinum*, the jealousy

of the artist for the artist, which is without doubt a defect, but one with which too many excellent artists appear to be stained for us to refuse to it some indulgence similar to that accorded to the defects of women, so difficult, as we know, to separate from their good qualities. Other artists should calmly reply to these artist-critics: "Continue doing in your art what you do so well, and let us do what we can do"; and to the artists who have failed and improvised themselves critics: "Do not claim that we should do what you have failed in doing, or what is work of the future, of which neither you nor we know anything." As a fact, this is not the usual reply, because passion forms half of it; but this is indeed the logical reply, which logically terminates the question, though we must foresee that the altercation will not terminate, but will indeed last as long as there are intolerant artists and failures—that is to say, for ever.

And there is another conception of criticism, which is expressed in the magistrate and in the judge, as the foregoing is expressed in the pedagogue or in the tyrant; it attributes to criticism the duty, not of promoting and guiding the life of art,—which is promoted and guided, if you like to call it so, only by history; that is, by the complex movement of the spirit in its historical course,—but simply to separate, in the art which has already been produced, the beautiful from the ugly, and to approve the beautiful and reprove the ugly with the solemnity of a properly austere and conscientious sentence. But I fear that the blame of uselessness will not be removed from criticism, even with this other definition, although perhaps the motive of this blame may to some extent be changed. Is there really need of criticism in order to distinguish the beautiful from the ugly? The production itself of art is never anything but this distinguishing, because the artist arrives at purity of expression precisely by elimi-

nating the ugly which menaces to invade it; and this ugliness is his tumultuous human passions striving against the pure passion of art: his weaknesses, his prejudices, his convenience, his *laissez faire*, his haste, his having one eye on art and another on the spectator, on the editor, on the impresario—all of them things that impede the artist in the physiological bearing and normal birth of his image-expression, the poet of the verse that rings and creates, the painter of sure drawing and harmonious colour, the composer of melody, and introduces into their work, if care be not taken to defend themselves against it, sonorous and empty verses, incorrections, lack of harmony, discordances. And since the artist, at the moment of producing, is a very severe judge of himself from whom nothing escapes,—not even that which escapes others,—others also discern, immediately and very clearly, in the spontaneity of contemplation, where the artist has been an artist and where he has been a man, a poor man; in what works, or in what parts of works, lyrical enthusiasm and creative fancy reign supreme, and in what they have become chilled and have yielded their place to other things, which pretend to be art, and therefore (considered from the aspect of this pretence) are called “ugly.” What is the use of the sentence of criticism, when the sentence has already been given by genius and by taste? Genius and taste are legion, they are people, they are general and secular consensus of opinion. So true is this, that the sentences of criticism are always given too late; they consecrate forms that have already been solemnly consecrated with universal applause (pure applause must not, however, be confounded with the clapping of hands and with social notoriety, the constancy of glory with the caducity of fortune), they condemn ugliness already condemned, grown wearisome and forgotten, or still praised in words, but with a bad conscience,

through prejudice and obstinate pride. Criticism, conceived as a magistrate, kills the dead or blows air upon the face of the living, who is quite lively, in the belief that its breath is that of the God who brings life; that is, it performs a useless task, because this has previously been performed. I ask myself what critics have established the greatness of Dante, of Shakespeare, or of Michelangelo: if, among the legions who have acclaimed and do acclaim these great men, there are or have been men of letters and professional critics, their acclamation does not differ in this case from that of youth and of the people, who are all equally ready to open their hearts to the beautiful, which speaks to all, save sometimes, when it is silent, on discovering the surly countenance of a critic-judge.

And so there arises a third conception of criticism: the criticism of *interpretation* or *comment*, which makes itself small before works of art and limits itself to the duty of dusting, placing in a good light, furnishing information as to the period at which a picture was painted and what it represents, explaining linguistic forms, historical allusions, the presumptions of fact and of idea in a poem; and in both cases, its duty performed, permits the art to act spontaneously within the soul of the onlooker and of the reader, who will then judge of it according as his intimate taste tells him to judge. In this case the critic appears as a cultivated cicerone or as a patient and discreet schoolmaster: "Criticism is the art of teaching to read," is the definition of a famous critic; and the definition has not been without its echo. Now no one contests the utility of guides to museums or exhibitions, or of teachers of reading, still less of erudite guides and masters who know so many things hidden from the majority and are able to throw so much light on subjects. Not only has the art that is most remote from us need of

this assistance, but also that of the nearest past, called contemporary, which, although it treats of subjects and presents forms that seem to be obvious, is yet not always sufficiently obvious; and sometimes a great effort is requisite in order to prepare people to feel the beauty of a little poem or of some work of art, though born but yesterday. Prejudices, habits and forgetfulness form hedges barring the approach to that work: the expert hand of the interpreter and of the commentator is required to remove them. Criticism in this sense is certainly most useful, but we do not see why it should be called criticism when that sort of work already possesses its own name of interpretation, comment, or exegesis. To call this criticism is at best useless, for it is equivocal.

It is equivocal because criticism demands to be, wishes to be and is something different: it does not wish to invade art, nor to rediscover the beauty of the beautiful, or the ugliness of the ugly, nor to make itself small before art, but rather to make itself great before art which is great and, in a certain sense, above it. What, then, is legitimate and true criticism?

First of all, it is *at once all three* of the things that I have hitherto explained; that is to say, all these three things are its necessary conditions, without which it would not arise. Without the moment of art (and, as we have seen, that criticism which affirms itself to be productive or an aid to production, or as repressing certain forms of production to the advantage of certain other forms, is, in a certain sense, art against art), the experience of art would be wanting to the critic, art created within his spirit, severed from non-art, and enjoyed in preference to that. And finally, this experience would be wanting without exegesis, without the removal of the obstacles to reproductive fancy, which supply the spirit with those presumptions of historical knowledge

of which it has need, and which are the wood to burn in the fire of fancy.

But here, before going further, it will be well to resolve a grave doubt which has been agitated and is still agitated; both in philosophical literature and in ordinary thought, and which certainly, where justified, would not only compromise the possibility of criticism, of which I am discoursing, but also of reproductive fancy itself, or taste. Is it truly possible to collect, as does exegesis, the materials required for reproducing the work of art of others (or our own past work of art, when we search our memory and consult our papers in order to remember what we were when we produced it), and to reproduce that work of art in our fancy in its genuine features? Can the collection of the material required be ever complete? And however complete it be, will the fancy ever permit itself to be chained by it in its labour of reproduction? Will it not act as a new fancy, introducing new material? Will it not be obliged to do so, owing to its impotence truly to reproduce the other and the past? Is the reproduction of the individual, of the *individuum ineffabile*, conceivable, when every sane philosophy teaches that the universal alone is eternally reproducible? Will not the reproduction of the works of art of others or of the past be consequently a simple impossibility; and will not what is usually alleged as an undisputed fact in ordinary conversation, and is the expressed or implied presupposition in every dispute upon art, be perhaps (as was said of history in general) *une fable convenue*?

Truly, when we consider the problem rather from without, it will seem most improbable that the firm belief which all possess in the comprehension and intelligence of art is without foundation,—all the more, if we observe that these very people who deny the possibility of reproductions in

abstract theory—or, as they call it, the absoluteness of taste—are yet most tenacious in maintaining their own judgments of taste, and very clearly realise the difference there is between the affirmation that wine pleases or displeases me because it agrees or disagrees with my physiological organism, and the affirmation that a poem is beautiful, and another a *pastiche*: the second order of judgments (as Kant shows in a classical analysis) carries with it the uncoercible pretension to universal validity; souls become passionate about it; and in days of chivalry there were even those who maintained the beauty of the “Gerusalemme,” sword in hand, whereas no one that we know has ever been killed maintaining, sword in hand, that wine was pleasant or unpleasant. To object that works artistically base have yet pleased many or someone, and if not others, their author, is not valid, because their having pleased is not set in doubt (since nothing can be *born* in the soul without the consent of the soul, and consequently without a correlative pleasure); but it is doubted whether that pleasure were æsthetic, and were founded upon a judgment of taste and beauty. And passing from extrinsic scepticism to intrinsic consideration, it should be said that the objection to the conceivability of the æsthetic reproduction is founded upon a reality conceived in its turn as a shock of atoms, or as abstractly monadistic, composed of monads without communication among themselves and harmonised only from without. But that is not reality: reality is spiritual unity, and in spiritual unity nothing is lost, everything is an eternal possession. Not only the reproduction of art, but, in general, the memory of any fact (which is indeed always reproduction of intuitions), would be inconceivable without the unity of the real; and if we had not been ourselves Cæsar and Pompey,—that is, that universal which was once determined as Cæsar and Pompey and is

now determined as ourselves, they living in us,—we should be unable to form any idea of Cæsar and Pompey. And further, the doctrine that individuality is irreproducible and the universal only reproducible is certainly a doctrine of “sound” philosophy, but of sound scholastic philosophy, which separated universal and individual, making the latter an accident of the former (dust carried along by time), and did not know that the true universal is the universal individuated, and that the only true *effable* is the so-called ineffable, the concrete and individual. And finally, what does it matter if we have not always ready the material for reproducing with full exactitude all works of art or any work of art of the past? Fully exact reproduction is, like every human work, an ideal which is realised in infinity, and therefore is always realised in such a manner that it is admitted at every instant of time by the conformation of reality. Is there a suggestion in a poem of which the full signification escapes us? No one will wish to affirm that that suggestion, of which we now have a crepuscular vision that fails to satisfy, will not be better determined in the future by means of research and meditation and by the formation of favourable conditions and sympathetic currents.

Therefore, inasmuch as taste is most sure of the legitimacy of its discussions, by just so much is historical research and interpretation indefatigable in restoring and preserving and widening the knowledge of the past; not mentioning that relativists and sceptics, both in taste and in history, utter their desperate cries from time to time, which do not reduce anyone, not even themselves, as we have seen, to the effectual desperation of not judging.

Closing here this long but indispensable parenthesis and taking up the thread of the discourse, art, historical exegesis, and taste, if they be conditions of criticism, are not yet criti-

cism. Indeed, nothing is obtained by means of that triple presupposition, save the reproduction and enjoyment of the image—expression; that is to say, we return and place ourselves neither more nor less than in the place of the artist-producer in the act of producing his image. Nor can we escape from those conditions, as some boast of doing, by proposing to ourselves to reproduce in a new form the work of the poet and the artist by providing its equivalent; hence they define the critic: *artifex additus artificei*. Because that reproduction in a new garment would be a translation, or a variation, another work of art, to some extent inspired by the first; and if it were the same, it would be a reproduction pure and simple, a material reproduction, with the same words, the same colours, and the same tones—that is, useless. The critic is not *artifex additus artificei*, but *philosophus additus artificei*: his work is not achieved, save when the image received is both preserved and surpassed; it belongs to thought, which we have seen surpass and illumine fancy with new light, make the intuition perception, qualify reality, and therefore distinguish reality from unreality. In this perception, this distinction, which is always and altogether criticism or judgment, the criticism of art, of which we are now especially treating, originates with the question: whether and in what measure the fact, which we have before us as a problem, is *intuition*—that is to say, is real as such; and whether and in what measure, it is not such—that is to say, is unreal: reality and unreality, which in art are called beauty and ugliness, as in logic they are called truth and error, in economy gain and loss, in ethic good and evil. Thus the whole criticism of art can be reduced to this briefest proposition, which further serves to differentiate its work from that of art and taste (which, considered in themselves, are logically mute), and from exegetical erudition (which lacks logi-

cal synthesis, and is therefore also logically mute) : "There is a work of art *a*," with the corresponding negative : "There is not a work of art *a*."

It seems to be a trifle, for the definition of art as intuition seemed to be neither more nor less than a trifle, but it has on the contrary been since seen how many things it included in itself, how many affirmations and how many negations : so many that, although I have proceeded and proceed in a condensed manner, I have not been able and will not be able to afford more than brief mention of them. That proposition or judgment of the criticism of art, "The work of art *a* is," implies, above all, like every judgment, a subject (the intuition of the work of art *a*) to conquer which is needed the labour of exegesis and of fantastic reproduction, together with the discernment of taste : we have already seen how difficult and complicated this is, and how many go astray in it, through lack of fancy, or owing to slightness and superficiality of culture. And it further implies, like every judgment, a predicate, a category, and in this case the category of art, which must be conceived in the judgment, and which therefore becomes the concept of art. And we have also seen, as regards the concept of art, to what difficulties and complications it gives rise, and how it is a possession always unstable, continually attacked and ambushed, and continually to be defended against assaults and ambushes. Criticism of art, therefore, develops and grows, declines and reappears, with the development, the decadence, and the reappearance of the philosophy of art ; and each can compare what it was in the Middle Ages (when it may almost be said that it was not) with what it became in the first half of the nineteenth century with Herder, with Hegel, and with the Romantics, in Italy with De Sanctis ; and in a narrower field, what it was with De Sanctis, and what it became in the

following period of naturalism, in which the concept of art became clouded and finally confused with physic and with physiology, and even with pathology. And if disagreements as to judgments depend for one half, or less than half, upon lack of clearness as to what the artist has done, lack of sympathy and taste for another half, or more than half, this arises from the small clearness of ideas upon art; whence it often happens that two individuals are substantially at one as to the value of a work of art, save that the one approves what the other blames, because each refers to a different definition of art.

And owing to this dependence of criticism upon the concept of art, as many forms of false criticism are to be distinguished as there are false philosophies of art; and, limiting ourselves to the principal forms of which we have already discoursed, there is a kind of criticism which, instead of reproducing and characterising art, breaks in pieces and classifies it; there is another, moralistic, which treats works of art like actions in respect of ends which the artist proposes or should have proposed to himself; there is hedonistic criticism, which presents art as having attained or failed to attain to pleasure and amusement; there is also the intellectualistic form, which measures progress according to the progress of philosophy, knows the philosophy but not the passion of Dante, judges Ariosto feeble because he has a feeble philosophy, Tasso more serious because his philosophy is more serious, Leopardi contradictory in his pessimism. There is that criticism usually called psychological, which separates content from form, and instead of attending to works of art, attends to the psychology of the artists as men; and there is the other form, which separates form from content and is pleased with abstract forms because, according to cases and to individual sympathies, they recall

antiquity or the Middle Ages; and there is yet another, which finds beauty where it finds rhetorical ornaments; and finally there is that which, having fixed the laws of the kinds and of the arts, receives or rejects works of art according as they approach or retreat from the models which they have formed. I have not enumerated them all, nor had I the intention of so doing, nor do I wish to expound the criticism of criticism, which could be nothing but a repetition of the already traced criticism and dialectic of Æsthetic; and already here and there will have been observed the beginnings of inevitable repetition. It would be more profitable to summarise (if even a rapid summary did not demand too much space) the history of criticism, to place the historical names in the ideal positions that I have indicated, and to shew how criticism of models raged above all during the Italian and French classical periods, conceptualistic criticism in German philosophy of the nineteenth century, that of moralistic description at the period of religious reform or of the Italian national revival, psychology in France with Sainte-Beuve and many others; how the hedonistic form had its widest diffusion among people in society, among boudoir and journalistic critics; that of classifications, in schools, where the duty of criticism is believed to have been successfully fulfilled when the so-called origin of metres and literary and artistic kinds and their representatives has been investigated.

But the forms which I have briefly described are forms of criticism, however erroneous; though this cannot, in truth, be said of other forms which raise their banners and combat among themselves, under the names of "æsthetic criticism" and "historical criticism." These I beg leave to baptise, on the contrary, as they deserve, *pseudo-æsthetic criticism* (or æsthetistic), and *pseudo-historical criticism* (or histori-

cal). These two forms, though very much opposed, have a common hatred of philosophy in general, and of the concept of art in particular: against any intervention of thought in the criticism of art, which in the opinion of the former is the affair of artistic souls; in the opinion of the latter, of the erudite. In other words, they debase criticism below criticism, the former limiting it to pure taste and enjoyment of art, the latter to pure exegetical research or preparation of materials for reproduction by the fancy. What *Æsthetic*, which implies thought and concept of art, can have to do with pure taste without concept is difficult to say; and what history can have to do with disconnected erudition relative to art, which is not organisable as history because without a concept of art and ignorant of what art is (whereas history demands always that we should know that of which we narrate the history), is yet more difficult to establish; at the most we could note the reasons for the strange "fortune" which those two words have experienced. But there would be no harm in those names or in the refusal to exercise criticism, provided that the upholders of both should remain within the boundaries assigned by themselves, these enjoying works of art, those collecting material for exegesis; and they might leave criticism to him who should wish to criticise, or satisfy themselves with speaking ill of it without touching problems which properly belong to criticism. In order to attain to such an attitude of reserve it would be necessary neither more nor less than that the *æsthètes* should never open their mouths in ecstasy about art, that they should silently degustate their joys, and, at the most, that when they met their like they should understand one another, as animals are said to do (who knows, though, if it be true!) without speaking: their countenance unconsciously bearing an expression of ravishment, their arms outstretched in an attitude of

wonder, or their hands joined in a prayer of thanksgiving for the joy experienced, should suffice for everything. Historians, for their part, might certainly speak: speak of codices, of corrections, of chronical and of topical dates, of political facts, of biographical occurrences, of sources of works, of language, of syntaxes, of metres, but never of art, which they serve, but to whose countenance, as simple erudites, they cannot raise their eyes, as the maid-servant does not raise them to look upon her mistress, whose clothes she nevertheless brushes and whose food she prepares: *sic vos, non vobis*. But go and ask of men such abstentions, sacrifices, and heroisms, however extravagant in their ideas and fanatic in their extravagances! In particular, go and ask those who, for one or another reason, are occupied with art all their lives, not to talk of or to judge art! But the mute æstheticians talk of, judge, and argue about art, and the inconclusive historians do the same; and since in thus talking they are without the guide of philosophy and of the *concept* of art, which they despise and abhor, and yet have need of a concept,—when good sense does not fortunately happen to suggest the right one to them, without their being aware of it,—they wander among all the various *preconceptions*, moralistic and hedonistic, intellectualistic and contentistic, formalistic and rhetorical, physiological and academical, which I have recorded, now relying upon this one, now upon that, now confounding them all and contaminating one with the other. And the most curious spectacle (though to be foreseen by the philosopher) is that the æstheticians and historians, those irreconcilable adversaries, although they start from opposite points, yet agree so well that they end by uttering the same fatuities; and nothing is more amusing than to meet again the most musty intellectualistic and moralistic ideas in the pages of deeply moved lovers of

art (so deeply moved as to hate thought), and in the most positive historians (so positive as to fear compromising their positivity by attempting to understand the object of their researches, which chances this time to be called art).

True criticism of art is certainly *æsthetic* criticism, but not because it disdains philosophy, like pseudo-*æsthetic*, but because it acts as philosophy and as conception of art; it is *historical* criticism, not because, like pseudo-history, it deals with the extrinsic of art, but because, after having availed itself of historical data for fantastic reproduction (and till then it is not yet history), when fantastic reproduction has been obtained, *it becomes history*, by determining what is that fact which has been reproduced in the fancy, and so characterising the fact by means of the concept, and establishing what exactly is the fact that has occurred. Thus, the two things at variance in spheres inferior to criticism coincide in criticism; and "*historical criticism of art*" and "*æsthetic criticism*" are the same: it is indifferent which word we use, for each may have its special use solely for reasons of convenience, as when, for instance, it is desired to call special attention, with the first, to the necessity of the understanding of art; with the second, to the historical objectivity of its consideration. Thus the problem discussed by certain methodologists is solved, namely, whether history enter into the criticism of art as means or as end: since it is henceforth clear that history adopted as a means is not history, precisely because it is a means, but is exegetic material; and that which enters it as end is certainly history, though it does not enter it as a particular element, but as its constituent whole: which precisely describes the word "end."

But if criticism of art be historical criticism, it follows that it will not be possible to limit the duty of discerning the beautiful and the ugly to simple approval and refusal in

the immediate consciousness of the artist when he produces, or of the man of taste when he contemplates; it must widen and elevate itself to what is called *explanation*. And since in the world of history (which is, indeed, the only world) negative or privative facts do not exist, what seems to taste to be ugly and repugnant, because not artistic, will be neither ugly nor repugnant to historical consideration, because it knows that what is not artistic yet is *something else*, and has its right to existence as truly as it has existed. The virtuous Catholic allegory composed by Tasso for his "Gerusalemme" is not artistic, nor the patriotic declamation of Niccolini and Guerrazzi, nor the subtleties and conceits which Petrarch introduced into his poems; but Tasso's allegory is one of the manifestations of the work of the Catholic counter-reform in the Latin countries; the declamations of Niccolini and of Guerrazzi were violent attempts to rouse the souls of Italians against the priest and the stranger, representing adhesion to the manner of that arousing; the subtleties and conceits of Petrarch, the cult of traditional troubadour elegance, revived and enriched in the new Italian civilisation; that is to say, they are all practical facts, very significant historically and worthy of respect. We can well continue to talk of the beautiful and of the ugly, in the field of historical criticism, through vivacity of language, or in order to chime with current parlance; provided that we shew at the same time, or hint, or let be understood, or at least do not exclude, the positive content, both of that beautiful and of that ugly, which will never be so radically *condemned* in its ugliness as when it is *fully justified and understood*, because in this case it will be removed in the most radical manner from the sphere proper to art.

For this reason, criticism of art, when truly æsthetic or historical, becomes at the same time amplified into a *criti-*

cism of life, since it is not possible to judge—that is, to characterise—works of art without at the same time judging and characterising the works of the whole life: as we observe with the truly great critics, and above all with De Sanctis, in his “History of Italian Literature” and in his “Critical Essays,” who is as profound a critic of art as of philosophy, morality, and politics; he is profound in the one because profound in the other, and inversely: the strength of his pure æsthetic consideration of art is the strength of his pure moral consideration of morality. Because the forms of the spirit, of which criticism avails itself as categories of judgment, although ideally distinguishable in unity, are not materially separable from one another and from unity, under penalty of seeing them vanish before us. We cannot, therefore, speak of a distinction of art from other criticism, save in an empirical manner, to indicate that the attention of the speaker or writer is directed to one rather than to another part of his indivisible argument. And the distinction is also empirical (I have hitherto preserved this here, in order to proceed with didactic clearness) between *criticism* and *history* of art: a distinction which has been specially determined by the fact that a polemical element prevails in the study of contemporary art and literature, which causes it to be more readily called “criticism,” while in that of the art and literature of a more remote period prevails the narrative tone, and therefore it is more readily termed “history.” In reality, true and complete *criticism* is the serene *historical narration of what has happened*; and history is the only true criticism that can be exercised upon the doings of humanity, which cannot be not-facts, since they have happened, and are not to be dominated by the spirit otherwise than by *understanding them*. And since the criticism of art has shewn itself inseparable from other criticism, so the history of art

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can be separated from the complete history of human civilisation only for reasons of a literary nature, among which it certainly follows its own law, which is art, but from which it receives the historical movement, which belongs to the spirit as a whole, never to one form of the spirit separated from the others.

BENEDETTO CROCE.



